Coal Age

NOVEMBER, 1953

A McGRAW - HILL PUBLICATION — PRICE 50c

Mining a 30-Ft Seam

How Union Pacific gets high recovery and safety in a 30-ft 18-deg seam (p 82).

"Notebook" Ideas

Suggested system for mining by gasification (p 80). Low-cost mobile flotation plant (p 94). "Sewing" bad top (p 102). Contents on p 5.

NCA MEETING REPORT .. p 140

Cost Cutting at the Face... p 70

How to keep the pot boiling!

Many mine operators to keep the 'pots boiling' simultaneously at the face...at the storage bin...at the preparation plant, depend on a.C.f. Mine Cars for *completely reliable* transportation.

They know they can't afford to risk idle men and machines by even a temporary haulage breakdown.

a.C.f. Mine Cars have proved their ability to keep production 'boiling' all along the line with many unique features.

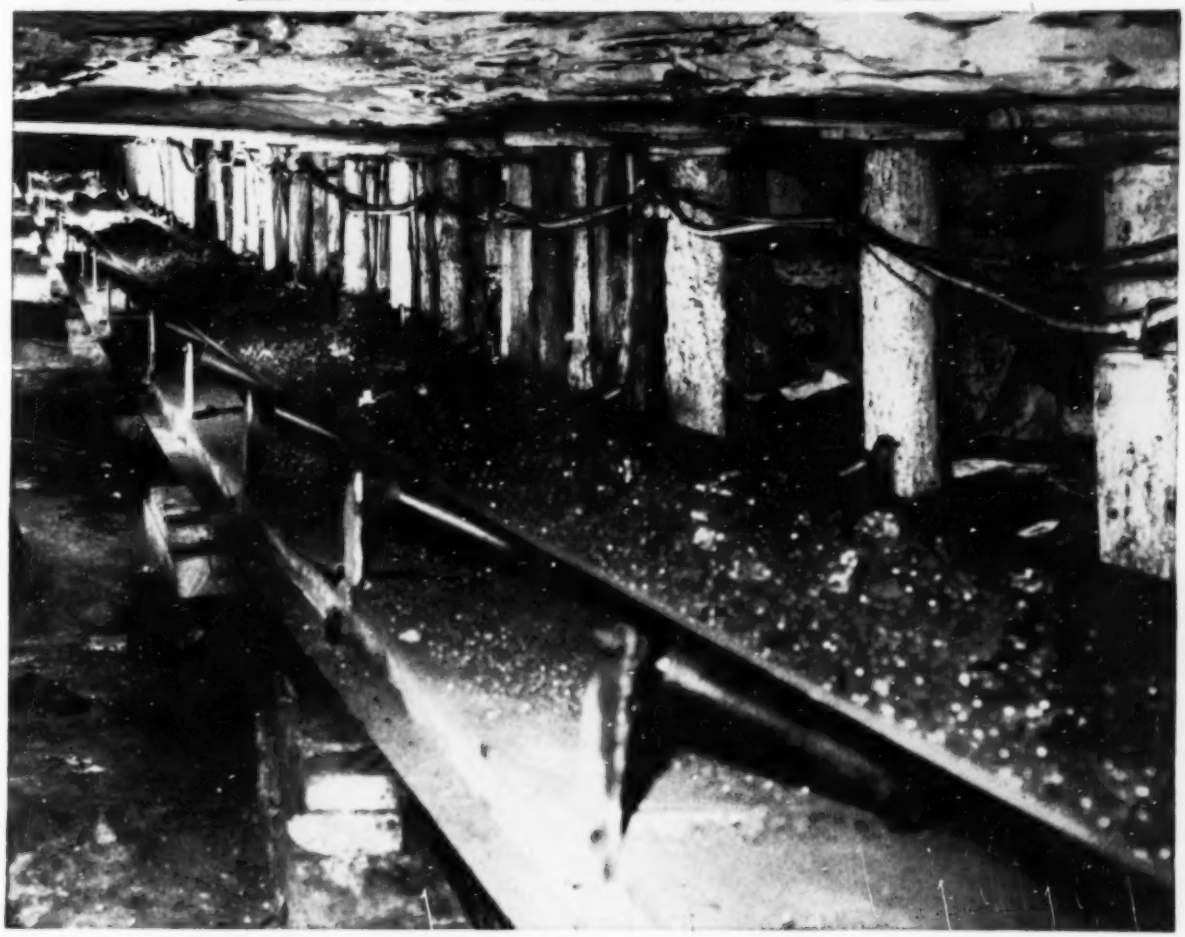
a.C.f. Drop-Bottom Design, for example, permits unloading at the rate of a ton a second. Simple over-all design permits on-the-spot repairs by your own men.

Your a.C.f. Representative will be glad to make a survey of your individual transportation problems, help you solve them quickly and economically. Get in touch with him today. American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland • Philadelphia Huntington, W. Va. • San Francisco • Washington • Berwick, Pa.

a.C.f. MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Why B. F. Goodrich cord belts reduce "spill", last longer

EXCESSIVE "spill" and costly belt damage are both caused by conveyor belts that don't trough properly —belts that are too stiff to conform to the idlers, and so run off center, wear along the edges.

In the B. F. Goodrich *cord* belt these problems have been eliminated. There's a ply of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together. There being no crossweave in the cord plies, the cord belt is more flexible, and so troughs and tracks perfectly whether empty, lightly or fully loaded. Spillage is reduced, belt keeps centered on idlers, requires less maintenance.

The B. F. Goodrich cord belt shown here had been in service 8 years when the picture was taken, and was in such good condition, engineers estimated it would last years longer. It handles 1440 tons of run-of-mine coal every 24 hours. Troughing is natural; there's been no maintenance due to edge wear.

Natural troughing is just one of the reasons B. F. Goodrich Caricoal cord belts last longer, serve better. Other construction features provide high impact resistance and double protection against mildew. To find out how these longer-lasting conveyor belts can cut your coal-handling costs, call in the nearest BFG distributor. Or send for the free booklet describing the B. F. Goodrich Caricoal line of conveyor belts.

The B. F. Goodrich Company
Dept. M-71, Akron 18, Ohio

Without cost or obligation, please
☐ send me booklet about B. F. Goodrich conveyor belts
☐ have a BFG distributor see me.

Name_____
Company_____
Address_____
City_____ Zone_____
State_____

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Two names PHILADELPHIA

Benj^a Franklin

Benjamin Franklin—printer, inventor, scientist, statesman, diplomat—was born in 1706 in Boston. The story of his arrival in Philadelphia at the age of 17, seeking work in a print shop, with only one "Dutch dollar" in his pocket, is famous. His frugality and hard work became a legend. Before he was 28 he learned French, Italian, Spanish, Latin; which fitted him for the brilliant diplomatic career in Europe which raised money to help save the Colonies. In 1752, at Race and Eighth Streets, in Philadelphia, he sent aloft his famous kite that drew electricity from the sky, charging a crude battery. He died in 1790 at 84, after a long life whose achievements "touched the circle of humanity at every point".

can well be proud of . . .

Hulburt Quality GREASE

You tell those old Friction Devils to "go fly a kite"—when you use Hulburt Quality Grease down in your coal mine on your mining machinery. The way Hulburt Grease combats friction is no legend—it's a hard fact, a money-saving fact, a fact that will save you every last "Dutch dollar" of operating and maintenance costs. When Ben Franklin said "a penny saved is a penny earned" he summed up the Hulburt creed in a way well understood by every Hulburt user.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

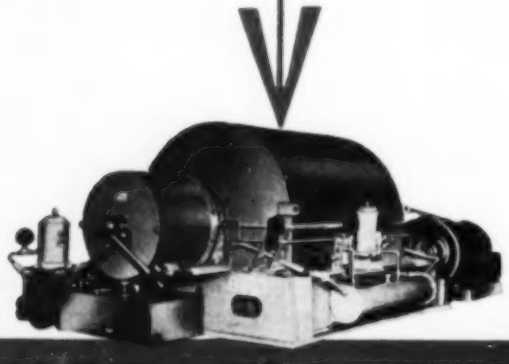
For FINE COAL of

Minimum Moisture Content

Lower Ash Content

you need

BIRD COAL FILTERS



IN the BIRD, an extra rinse washes out that small percentage of ultra fine, high ash particles that retains such a high percentage of the moisture. There's no loss of good coal.

Bird Coal Filters handle up to a ton or more of ¼ x 0 a minute. Total cost is less than seven cents a ton.

Why not look into this *modern* method of dewatering fine coal?

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

NOVEMBER • 1953

Where Do YOU Get Ideas?

OPERATING OFFICIALS tell us they get new ideas from many sources, from visits to other mines, discussions at meetings, talking with other mining men and, of course, from reading *Coal Age* regularly. Many men who can't spare the time to get around the way they'd like, depend on *Coal Age* to keep them informed on what's going on. *Coal Age* editors traveled well over 6,000 mi last month just to do that job, and that's not unusual.

Some ideas are big and need action by a company president or even the board of directors. Others, though small in dollar cost, are mighty important when translated into savings per ton mined. In this issue, you find some of both.

In This Month's Issue . . .

If you've anything to do with underground operations, you'll find "Cost Cutting at the Face" (p 70) well worth your time, we think. For good ideas on other phases of mining, there's plenty of thought-provoking material in other major articles (pp 80-102) and the Operating Ideas section (pp 110-116). If you find anything of interest in the Equipment News section (p 118), make use of the postage-free card facing p 124, and be sure to look over this month's News Round-Up (p 135).

Coming in Coal Age

How 100% training in accident prevention has proved itself in safer, lower-cost operation at mines in Kentucky and Virginia is one case-history study scheduled for December. Others planned for that or later issues include How to Get Longer Cable Life . . . How Wood Pins Saved $30,000 at One Mine . . . Splicing Conveyor Belts Properly . . . Getting 44 Tons Per Man With Bridge Conveyors . . . How a New Portal Cut Travel Time Nearly a Half-Hour.

COAL AGE — NOVEMBER, 1953
VOLUME 58 — NUMBER 11

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TEXACO
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NON-STOP LOADING

HYDRAULICALLY-OPERATED loaders, cutters and other equipment all turn in outstanding records for long non-stop production when the hydraulic medium is *Texaco Regal Oil (R & O)*. This is the oil that tests show has *more than ten times the oxidation-resistance of ordinary turbine-quality oils* — far greater ability to prevent rusting and foaming.

Texaco Regal Oil (R & O) keeps hydraulic systems free from sludge, rust and foam. This means smooth, trouble-free performance with no unscheduled stops in production. There is a complete line of *Texaco Regal Oils (R & O)* — proper viscosities for every hydraulic job.

In mine car wheels, use *Texaco Olympian Grease* to assure easier starts in cold weather as in warm. *Texaco Olympian Grease* gives longer lasting protection for plain, cavity hub or anti-friction bearings. Three consistencies to meet every requirement.

A Texaco Lubrication Engineer will gladly help you step up the production efficiency of your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

AN ALLIS-CHALMERS REPORT

How hydraulic torque converter drive improves big tractor performance–increases job output

With a two-range transmission and hydraulic torque converter, the Allis-Chalmers HD-20 is the only crawler tractor that is capable of exerting maximum drawbar pull *at all times* . . . under all load and terrain conditions . . . without gear-shift guesswork.

Whatever the job, the operator need merely make contact with the load and then open the throttle. As the load requirements change, the hydraulic torque converter *automatically* matches the conditions with exactly the right combination of speed and pull.

This eliminates most shifting . . . leads to far more work done in a continuous work cycle . . . far longer equipment life.

BULLDOZING — Hydraulic torque converter lets Allis-Chalmers HD-20 take full advantage of available horsepower, roll bigger loads, tackle tougher dozing jobs. With full control at the throttle, operator can work safely and efficiently, regardless of terrain.

PULLING — Hydraulic torque converter drive actually multiplies torque up to four and one-half times... develops tremendous drawbar pull to start the load smoothly . . . and automatically accelerates to the highest speed that conditions permit, in either high or low range.

PUSHING — Operator just makes contact, then opens the throttle and relaxes. The HD-20 automatically matches speed to that of pushed equipment, maintains steady contact while loading, sends load off to the fill at higher speed.

DIGGING AND LOADING — With the HD-20G, the operator crowds surely and steadily, using only throttle and bucket levers. With full horsepower always available even at creeping speed, he can work effectively in mud, on hillsides or the edges of banks.

OPERATOR COMFORT AND EFFICIENCY — He chooses speed range when he starts, and he can finish most jobs without further clutching or shifting (except for reverse). Result — he works easily, yet efficiently all day long.

LONGER LIFE FOR BIG EQUIPMENT — Hydraulic cushioning reduces shock and vibration, with less strain, less wear on both the HD-20 and its auxiliary equipment, whether mounted or drawn. That means *less* downtime, *more* production time.

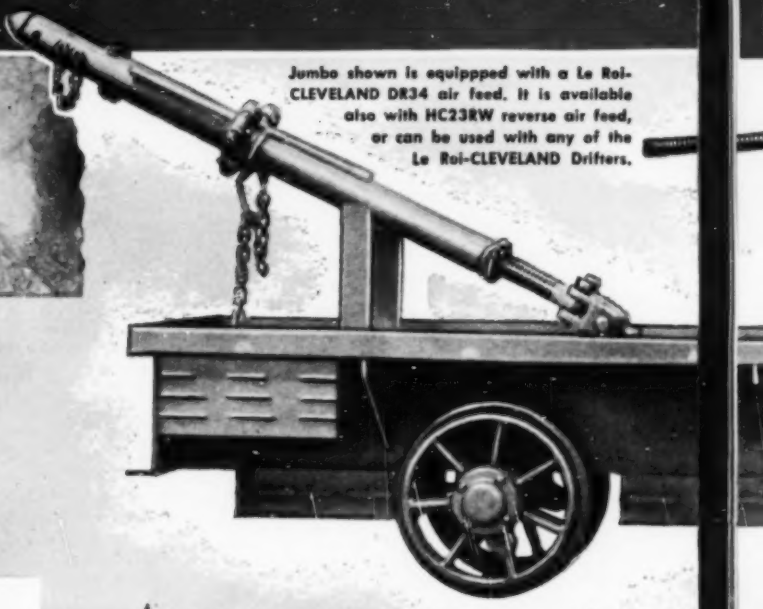
Hydraulic torque converter drive, exclusive as standard equipment with Allis-Chalmers, is just one of many reasons why the HD-20 assures you higher output with less upkeep. Your nearby Allis-Chalmers dealer invites you to get the full story . . . and to see it in action.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

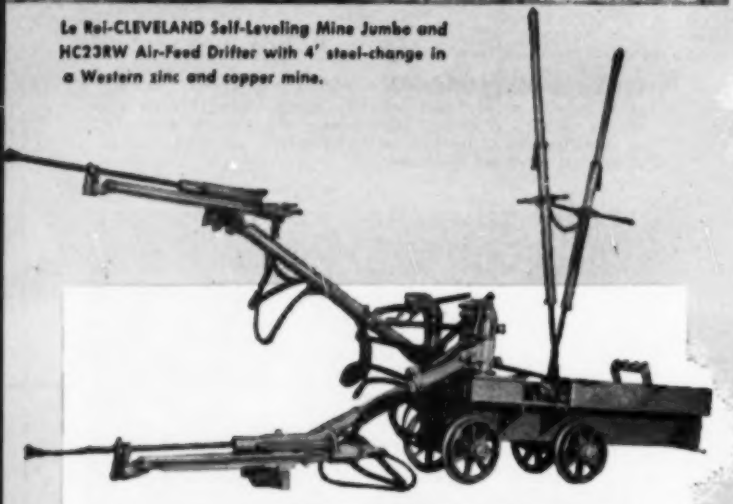
Weight — 41,000 lb.
175 net hp. at flywheel

A compact Le Roi-CLEVELAND Air Motor powers the arm of this mine jumbo — miners can take it easier, yet get more done.

Space, Spot,

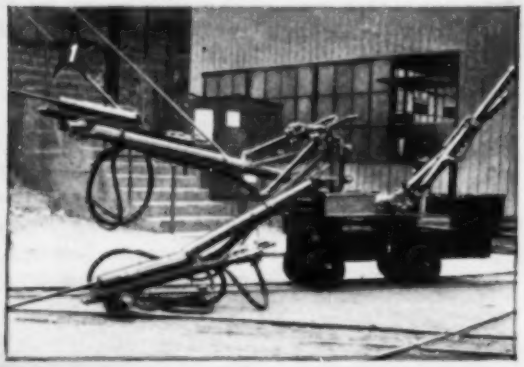


Jumbo shown is equippped with a Le Roi-CLEVELAND DR34 air feed. It is available also with HC23RW reverse air feed, or can be used with any of the Le Roi-CLEVELAND Drifters.



Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air-Feed Drifter with 4' steel-change in a Western zinc and copper mine.

1. Le Roi-CLEVELAND 2-Boom Jumbo with power-feed drifters about to go underground.
2. Six-drill jumbo with Le Roi-CLEVELAND power-feed drifters and air-motor booms mounted on a 1 ½-ton truck for tunnel job.
3. Le Roi-CLEVELAND Jumbo equipped with long-feed drifters for use with carbide-insert bits.
4. Air-motor-powered booms give fast, solid set-ups. It's mechanically impossible for booms to drift during the drilling operation.



Le Roi-CLEVELAND MDR Jumbo

Le Roi-CLEVELAND Jumbos — equipped with air-motor-powered booms — reduce set-up time, drill out the round faster, shorten tear-down time.

To spot his drifter, the miner simply opens a conveniently located operating valve. Then a powerful, compact Le Roi Air Motor takes over, raising or lowering the boom rapidly to the desired drilling position.

What's more important, the boom stays where it's put. Drifters stay in line — there's no steel binding, no wear-and-tear on chucks. Average drilling speeds are higher.

Write for complete information.

and Drill Holes Faster!

Speed drilling cycles!	*Get better fragmentation!*
Save time drilling lifters!	*Speed loading cycles!*

Use a Le Roi-CLEVELAND Self-Leveling Mine Jumbo

with 4' steel-change Air-Feed Drifter

Want to get more drilling done per man-shift? Here's an easy way to go about it: Give your miners a Le Roi-CLEVELAND Self-Leveling Jumbo. It has everything they need to do the work you want — and cut your costs, too.

It has a self-leveling air-motor-powered arm. And that means miners can spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

It has an exclusive rigid screw and gearing mechanism that keeps the heading straight, cuts down overbreak and underbreak. It also keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

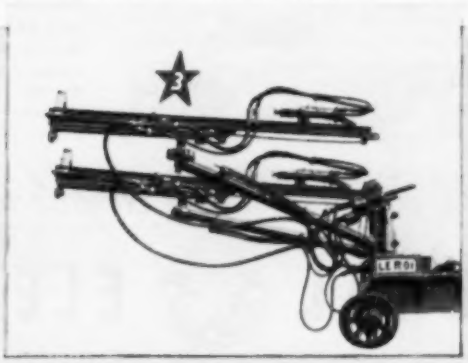
It has an offset arm that provides plenty of clearance to drill lifters. Miners don't have to take time out to swing the drill under the arm.

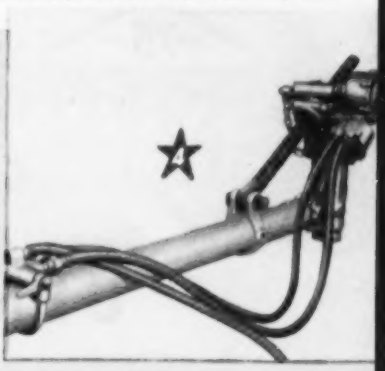
Together, these Le Roi-CLEVELAND features add up to faster cycles, greater tonnage per man-shift, lower costs! And that's why you owe it to yourself to get further information on both the single-arm and double-arm models. Write us today.

CLEVELAND ROCK DRILL DIVISION

Le Roi Company *A Subsidiary of Westinghouse Air Brake Co.*

12500 BEREA ROAD • CLEVELAND 11, OHIO *Plants:* Milwaukee, Cleveland and Greenwich, Ohio





BROAD CRAWLER TREADS ENABLE G-E SHUTTLE CAR TO EASILY NEGOTIATE SOFT OR WET BOTTOMS, EVEN WHEN FULLY LOADED

New G-E Shuttle Car Proving Ideal for All Types of Mining Conditions

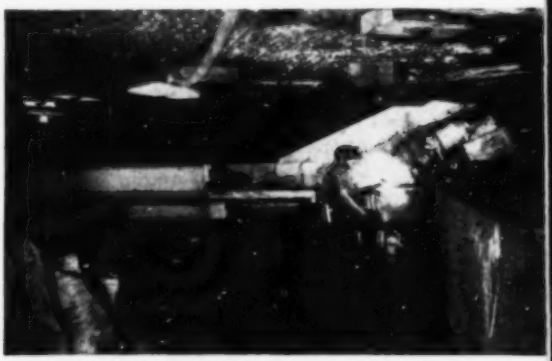
Low ground pressure, greater maneuverability, lower maintenance costs made possible with crawler treads

Using crawler treads instead of rubber-tired wheels, the new General Electric shuttle car is proving its efficiency and versatility under all types of mining conditions. Fully loaded, the car has only 20 pounds per square inch ground pressure. With a 14 to 16 foot turning radius, the car is ideal for operation where tunnels are narrow and turns are sharp. The wide conveyor, which is made possible by the use of crawler treads and the absence of wheel-wells, increases carrying capacity up to 300 cubic feet (with 12-inch sideboards).

The G-E shuttle car is simplicity itself in design and ease of operation. All motors and controls, though well-protected from abrasive materials and meeting U.S. Bureau of Mines' specifications, are easily accessible for servicing and maintenance.

Whatever mining conditions you face—no matter how rigorous they are—the new G-E cable-reel track-laying shuttle car can meet your requirements of service and economy. For complete information contact your nearest G-E sales office. General Electric Company Schenectady 5, New York. 120-65

1879 75 1953 YEARS OF ELECTRICAL PROGRESS



Only 42 inches high, the G-E shuttle car has a carrying capacity 30 per cent greater than cars of conventional design. Car above, at Jamison Coal and Coke Co., Hostetter, Pa., shows simplicity of unloading in tight quarters.

You can put your confidence in—

GENERAL ELECTRIC

save money, time, and work!

IN CHUTES U·S·S A-R (abrasion-resisting) steel is a low-cost steel made to meet the demands of the coal and materials handling industries. It is used in chutes and conveyors where abrasion is a problem.

IN MINE CARS U·S·S Cor-Ten steel is distinguished by its unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel. This property helps assure long life in mine cars and other equipment subject to corrosive elements.

1933 USS HIGH STRENGTH STEELS 1953 — UNITED STATES STEEL — TWENTY YEARS OF PERFORMANCE

Here's the story in a nutshell

U·S·S Man-Ten and U·S·S Tri-Ten steels have a yield point 50% higher than that of ordinary steel. Parts ordinarily prone to failure can be made highly resistant to wear, fatigue and shock. U·S·S Cor-Ten steel, in addition to having these same properties, offers resistance to atmospheric corrosion. And, U·S·S A-R steel can give maximum resistance to abrasion.

This means you get maximum durability in your equipment and therefore maximum use.

You save the *work* of frequent repair jobs, you save the *time* lost by frequent breakdowns, and you save the *money* spent for frequent parts replacement.

Because U·S·S High Strength Steels have 50% higher yield point you can increase the strength of parts *without increasing their weight*. Or, you can use these steels in lighter sections and *reduce weight* without reducing the present strength of your equipment.

These famous "steels that do more" have been used by the mining industry for almost 20 years. Our engineers will be glad to show you how they can be used to add strength and durability to your equipment.

Phone or write our nearest office today.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S HIGH STRENGTH STEELS

USS

UNITED STATES STEEL

NO-TURN SHUTTLE HAUL

In confined underground operation, fast-shuttling Dumpsters are ideal for no-turn hauling in tunnels and along narrow passageways. Also note how low rear entry to Dumpster body permits easy loading under low ceiling. Compact body is 5' x 5' for loading over end or sides.

This mountain-side job shows typical no-turn shuttle advantage. Hauling along narrow ledge, Dumpster spots close to Koehring 1½-yard 605 — gets its load, drives to fill, dumps, and returns to the shovel — without turning. Dumpsters are operated with equal ease in both directions.

increases hourly output over 10%

With Koehring fast-shuttling Dumptors, there is no need to turn at the loading unit, along narrow haul roads, or at the dump. Koehring constant-mesh transmission gives the same 3 fast speeds forward and reverse. Every turn saved cuts 15 seconds off your cycle time, and adds up to a big increase in yards hauled per hour.

On a 1,000-foot haul, eliminating only 2 turns saves ½ minute every round trip. Where you would get an average of 13.6 trips per hour with 2-turn operation, Dumptor *no-turn shuttle hauling* gives you 15.4 trips. That's an increase of 1.8 trips an hour on the same, 1,000-foot haul.

Fast, easy spotting and 1-second gravity dump also help keep production high. Your Koehring distributor can show you many other cost-cutting advantages with heavy-duty, 6-yard Dumptors.

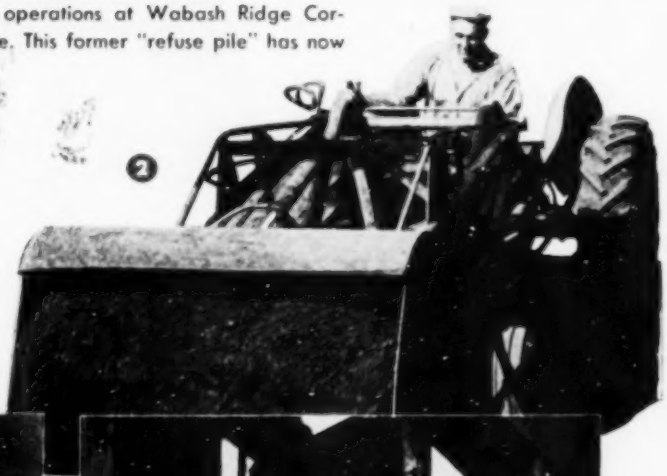
KOEHRING COMPANY, Milwaukee 16, Wis.

KOEHRING DUMPTOR®

Subsidiary Companies: JOHNSON • PARSONS • KWIK-MIX

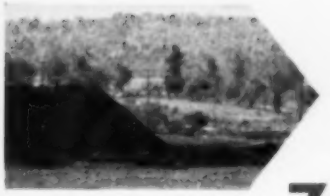
❶ The waste product from the former screening operations at Wabash Ridge Corporation's Midmont Mine formed this giant gob pile. This former "refuse pile" has now become a stockpile of valuable coal.

❷ In the first step of the recovery operation, coal is moved from the stockpile by truck and dumped near the conveyor system leading to the Reineveld Coal Dryer. A bulldozer then loads the coal onto the conveyor belt to be fed into the dryer at the rate of 32 TPH. *This feed is 85% 6 mesh x 0 material* having a surface moisture of 16%.



❸ 82½ gallons of fresh water per minute are added to the feed material just before it enters the Dryer; thus the feed material enters the Dryer in slurry form.

❹ The Reineveld Dryer performs a dual function in this operation by classifying the feed slurry at 60 mesh while drying it from 50% surface moisture to 5½-7%. This classification results in an ash reduction from 16½% in the feed to 10½% in the dried cake. *The recovery rate is 75% on a dry basis* and the effluent contains 14% solids.



How Wabash Ridge Corp.

RECOVERS and SELLS 75% OF THEIR GOB PILE

With the Reineveld Fine Coal Dryer

UNTIL a year ago the gob pile at Wabash Ridge Corporation's Midmont Mine represented nothing but the refuse from the screening plant. Today, after one pass through the Reineveld Fine Coal Dryer, 75% of the coal in this stockpile is being recovered and sold to a waiting market.

5 The recovered coal is discharged from the Reineveld Dryer onto a conveyor system and loaded directly into railroad cars for delivery to the customer, completing the "waste to profit" cycle.

In this recovery operation, the former "waste" coal is fed into the Reineveld Dryer as a slurry. This slurry is then *screened and dried in one operation* in the Dryer.

This unique application of the Reineveld Fine Coal Dryer results in recovered coal with a considerable reduction in ash content and surface moisture. The recovered coal is conveyed directly from the Reineveld Dryer to railroad cars for shipment to the customer.

Whether you have a similar problem to the one described on these pages or an entirely different coal drying problem . . . investigate the versatility, the efficiency and the operating advantages of the Reineveld Centrifugal Fine Coal Dryer. You always gain when you call on the half-century of experience of Heyl & Patterson to help you with *all* of your coal preparation problems.

THE CONIDURE SCREENS

that are used in the Reineveld Dryer screening operation at Wabash Ridge Corp. are 2 mm. thick with 0.8 mm. perforations.

At Wabash Ridge these Conidure screens last 5 times as long as standard punched plates with 1 mm. thickness.

Write Heyl & Patterson for full information on the outstanding performance of Conidure screens.

Coal Handling Equipment
Boat Loaders & Unloaders
Coal Storage Bridges
Coal Preparation Plants
Cyclone Thickeners
Reineveld Centrifugal Dryers
Thorsten Coal Samplers
Bradford Breakers
Coal Crushers
Rotary Mine Car Dumpers

Heyl+Patterson, Inc.

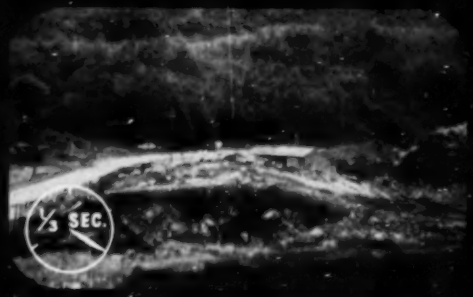
"SINCE 1887"

55 FORT PITT BLVD. PITTSBURGH 22, PA.

the inside story

Here's how ROCKMASTER® increases displacement

Final muck pile as seen from the road.



When the contractor or stripping operator says he wants a blast to produce increased displacement he means, "Well broken rock, piled up for easy digging" . . . the way it is in the large photo above. In this tight shot the rock was not thrown high, but it was thoroughly broken and dislocated from its original position.

The height of the final pile shows the increased displacement you can get with ROCKMASTER millisecond delays in an alternate pattern. When the blast is shot the first delays thoroughly stress the burden. Then at the instant of maximum stress, the next delays hit the burden with a churning action that twists and turns the rock. Without this double punch, the rock would tend to drop back into place. This would mean hard, expensive digging at the bottom of the pile even though the top rock might look well broken.

To see how you can profit by using the correct number of the sixteen ROCKMASTER millisecond delay electric blasting caps teamed with the ROCKMASTER system of explosives choice and loading methods, write for your copy of the 20-page ROCKMASTER booklet and a reprint of the paper "OVERBURDEN BLASTING TECHNIQUES."

ATLAS

ATLAS EXPLOSIVES

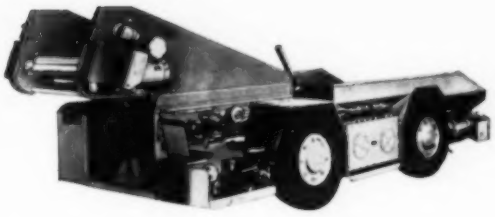
"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

Meet the Champ—The 1953 Model 10-SC!

It's the fastest round-trip SHUTTLE CAR built for high-production mining today.



The improved Joy 10-SC Shuttle Car is available as a Permissible or Non-Permissible unit, for net payload capacities up to 10 tons. It is built in 43", 48" or 54" heights (machine only) and may be equipped with 4", 6" or 8" sideboards. Tramming speed loaded is approximately 4½ m.p.h., and the unit is equipped with Joy-pioneered hydraulic cable reel, and hydraulically adjustable elevating discharge. Other special features include: 4-wheel drive, 4-wheel positive steering (hydraulic "power" type) and 4-wheel disc-type brakes, unaffected by dirt, coal dust, oil or water . . . improved arrangement of operator's controls . . . new "zone"-type lubrication . . . dependable Joy "Magnetax" controls, etc.

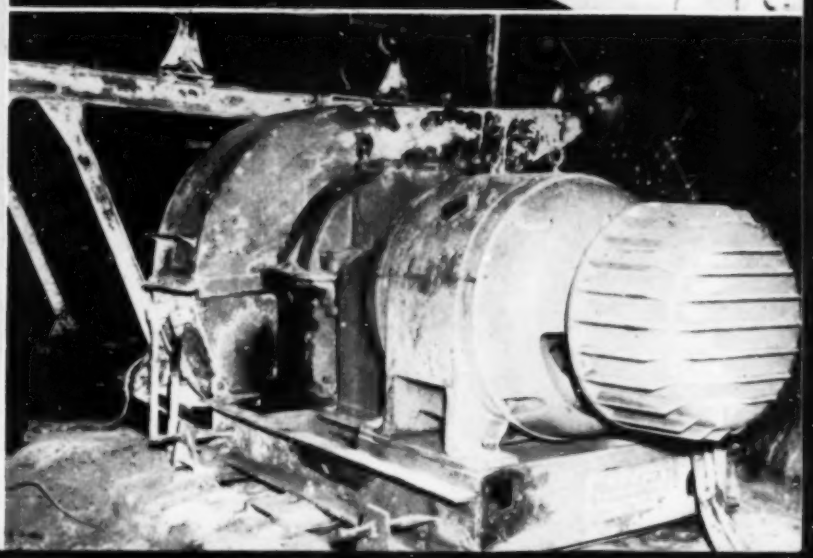
The Joy 10-SC Shuttle Car is famous for dependable, high-tonnage hauling under the toughest conditions, such as handling full loads of coal or rock in split-seam mining, etc. But we've improved it! The 1953-model 10-SC can get from the face to the discharge point and back again for another payload *faster than any other car in its class.* For some of the reasons why, check these features: traction motors of new design, with more reserve power . . . higher-speed, higher-powered conveyor discharge, cutting unloading time as much as half . . . over-capacity wheel units, brakes, gearing and frame for the least possible down-time and maintenance costs. ● There's actually nothing in the field like the 10-SC! Let us give you complete details. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

W&D CL4595

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT



FACTS and FIGURES ON THIS ALL-BELT JOB

36" panel belts carry the coal from working areas and deposit it on 42" sub-main haulage belts running from either side (five each way) to a 48" main haulage belt for delivery to a storage hopper. The 42" belts are projected to 9000' from the main belt, with a drive unit every 4000'. Coal flows at 500 fpm on the 42" belt, and at 600 fpm on the 48" belt.

All 42" and 48" conveyors are of Joy knockdown type, with heavy duty idlers, drives and take-ups, and with impact idlers where required to absorb shock of large lump transfer. A 48" transfer belt, with Joy impact idlers throughout, takes the discharge from each 42" belt, reducing wear and impact damage on the 48" main belt. A unique 60" Joy shuttle feeder belt serves the storage hopper, and a 48" feeder takes the coal from the hopper to a 48" steel cable slope belt for delivery out of the mine.

Although rated at 1000 TPH on this job, installed in a highly modern mid-western operation, a Merrick weightometer has shown up to 2400 TPH going over the 48" belts.

Anything from a single belt to an all-belt conveying system like the job illustrated at left

...Let Joy Engineer it

SPECIAL FEATURES GIVE YOU EXTRA ADVANTAGES

The Joy line includes a complete selection of belt conveyors to meet any underground operating condition for gathering, main line or slope haulage—and any requirement above ground as well. They're built in any required width from 26" to 48", and in a wide range of styles and sizes. All Joy Belt Conveyors feature refinements of design and materials which insure rugged, heavy-duty construction, and provide field-proven dependability and low maintenance.

KNOCKDOWN DESIGN MAKES ADVANCING FAST AND EASY

Strong, pan-type intermediate sections are produced in 8', 9', 10' or 12' lengths, with idler spacings to suit the job and with 4", 5" or 6" dia. rolls. They're built to secure the maximum ratio of strength to weight, and the component parts bolt together to form extremely rigid, dependable units.

Joy "knockdown-type" conveyor sections are highly appealing features to most operators. They provide the easy portability so essential in low coal, and in any seam, they greatly reduce the labor and down-time losses of conveyor advances or change-overs.

HEAVY DUTY IDLERS, DRIVES, ETC.

Joy idler rolls are regularly supplied either with sealed-for-life ball bearings, requiring no attention, or with grease-type roller bearings as desired. Both styles are built for severe service, but in addition, we have developed a new series of heavy-duty belt idlers which offer the ultimate in high-tonnage, high-speed transport of bulk material, with long service life and low repair costs. With a 48" belt, the new idlers are rated to carry 1300 tons per hour at a belt speed of 600 feet per minute, and actual performance has reached 2400 TPH.

Investigate the benefits of Joy Heavy Duty Idlers on your belt haulage jobs. And remember, Joy is the only manufacturer of both tandem-pulley conveyor drives and direct-connected, totally-enclosed single pulley drives. We have the experience and the equipment to answer your conveyor problems *best* . . . let us help you.

● ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

WBD CL 4806

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

JOY SAL-37T

TELESCOPIC FEED—LONG
STEEL CHANGES—LIGHTWEIGHT
LOW AIR CONSUMPTION

JOY SAE-9IT

TELESCOPIC FEED—LONG
STEEL CHANGES—SHORT
OVERALL LENGTH—HEAVY DUTY

THESE ROOF-BOLTING STOPERS GET THE JOB DONE FASTER and CHEAPER

You can cut your roof-bolting costs away down with Joy Stopers . . . with constant-pressure telescopic feed and centralized control.

In the first place, the long steel changes that Joy Drills afford mean *fewer* steel changes for your roof-bolters and more time spent in actually drilling . . . *more hole footage per shift.* What's more, fewer steel sizes need be carried in stock and hauled to the face.

In the second place, Joy Stopers have several exclusive features: such as *cadmium-plating* inside and out for rust-protection, closer tolerances and easier run-ins . . . and the famous *Dual Valve* that "makes air do more work". These features make for greater efficiency, longer service life and less maintenance.

Joy builds a complete line of roof-bolting equipment—air-operated or hydraulic. ● *Call on us for details . . . Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

SPECIFICATIONS

	SAL-37T			SAE-9IT			
Steel Changes	30"	36"	42"	30"	36"	42"	48"
Weight	63#	65#	67#	98#	103#	106#	109#
Collapsed Length	25"	28"	31"	23¼"	29⅝"	32⅝"	35⅝"
Extended Length	61"	70"	79"	57½"	73⅛"	82⅛"	91⅛"

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL-4301

U.S. ROYAL

CON-TRAK-TOR

FULL LUG

Pulls Down Haulage Costs!

Assign your rugged haul-loads *here!* This new Con-Trak-Tor is built with exclusive full-width lugs for *super* truck *traction*. It's got *triple protection* against impact—extra rubber between plies, double shock-pads, rock-resister cap-plies. It pulls and *works*, saves and *pays* like no other off-road tire! **Also available in Nylon for heaviest duty.**

Want proof? See or phone your U. S. Royal Dealer *Today!*

Specialized by U. S. ROYAL to do your jobs better!

U. S. ROYAL FLEETMASTER	U. S. ROYAL ROAD TRACTION	U. S. ROYAL LUG TRACTION
Smooth rolling *on* the road, superior traction *off*. 70% more tread depth!	New steering ease where most hauling is on-road at reasonable speed.	Best for high traction at low speeds off the road or on unimproved roads.

FREE—NEW 64-PAGE BOOKLET *SEND COUPON!*

U. S. Royal Truck Tire Department,
United States Rubber Company, Dept. C,
1230 Avenue of the Americas, New York, N. Y.

Please send me your new booklet of latest tire information, engineering and service aids, weight charts, load and inflation tables, etc.

Name _____

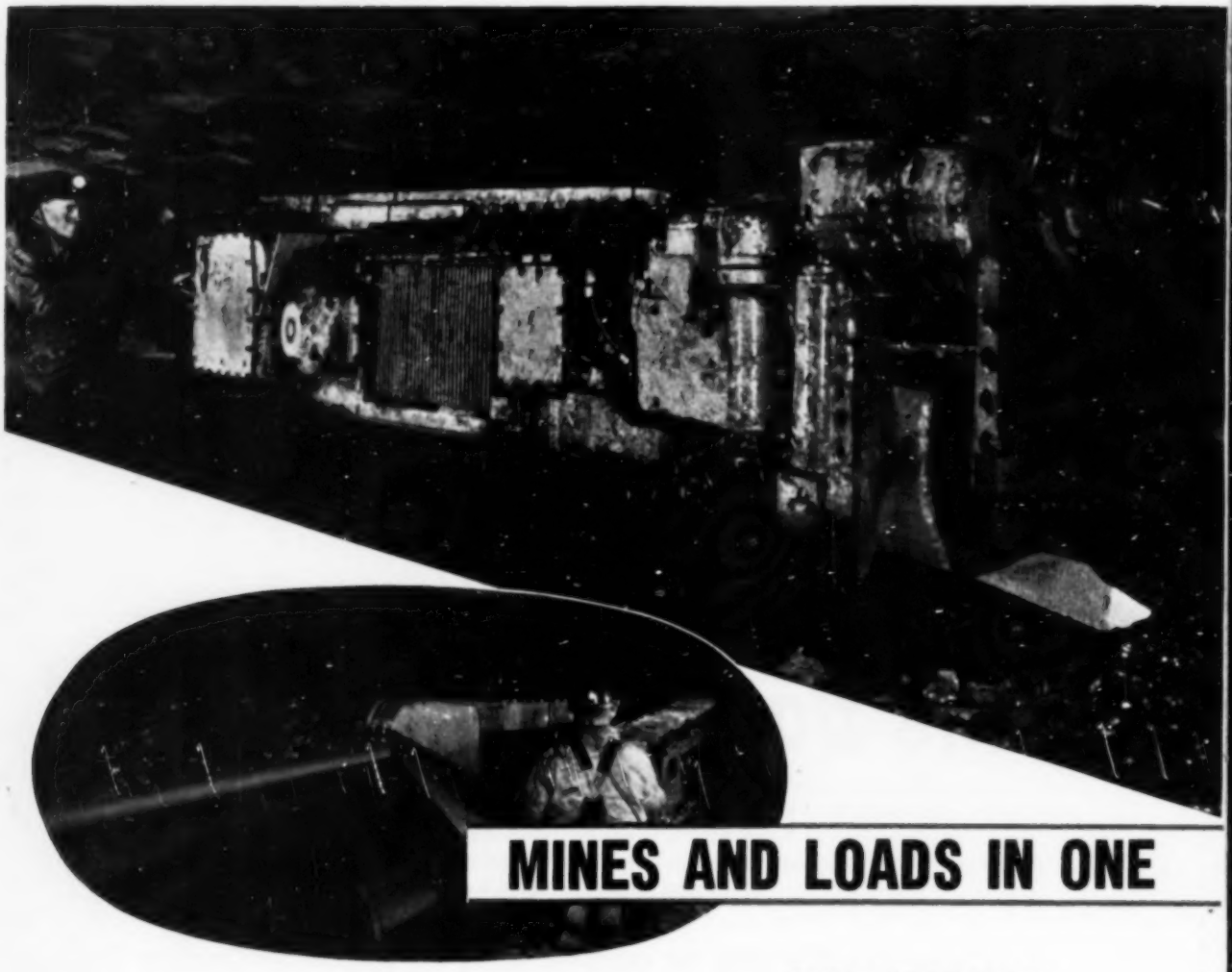
Company _____

Street _____

City & State _____

U. S. ROYAL TIRES *Product of* **UNITED STATES RUBBER COMPANY**

JEFFREY continues



MINES AND LOADS IN ONE

Top photo—a No. 76-A COLMOL mining by the popular "offset cut" method. An entry approximately 16-feet wide can be driven in two passes of the unit. Cutting range from 38" to full height of seam. A low-type unit is shown at right—above.

In oval—coal travels back on discharge conveyor at the rate of from two to four tons per minute. Coal is generally discharged into shuttle cars for transportation to a belt conveyor or mine cars.

POWERFUL
RUGGED
COMPACT
FAST

to modernize coal mining

THE COLMOL

OPERATION WITHOUT USE OF EXPLOSIVES

This safe, rapid method of mining large quantities of coal has introduced a new conception of modern mining . . has become an important contribution to the industry. With a single unit, coal is mined and loaded without the use of explosives. The COLMOL has eliminated the necessity for separate drilling, cutting and loading equipment. Production from this machine will run from 40 to 80 tons per man shift depending upon the height of coal.

Information on the COLMOL—what it is, how it is built, how it works, what it can do—will be sent on request.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

Wire Rope at Work – This is the woodyard at Kraft Center, Cantonment, Fla., one of the largest enterprises of the St. Regis Paper Company. Here they build and move mountains – enormous mountains of logs. The stockpiles normally carry an inventory of 30,000 cords, and 1200 to 1400 cords are fed daily to the chippers at the paper mill.

The cranes you see in the yard are moving vast quantities of pulpwood, building up reserves so that the mill, with its healthy appetite for logs, will never go hungry. This is a job, too, for Bethlehem Wire Rope, which is rigged on the hard-working cranes. It is a punishing chore by any standard, the kind entrusted to Bethlehem rope in virtually every type of industry, wherever there's lifting or hauling to be done.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

How 64 TIMKEN® bearings in a continuous "Miner" help keep it that way

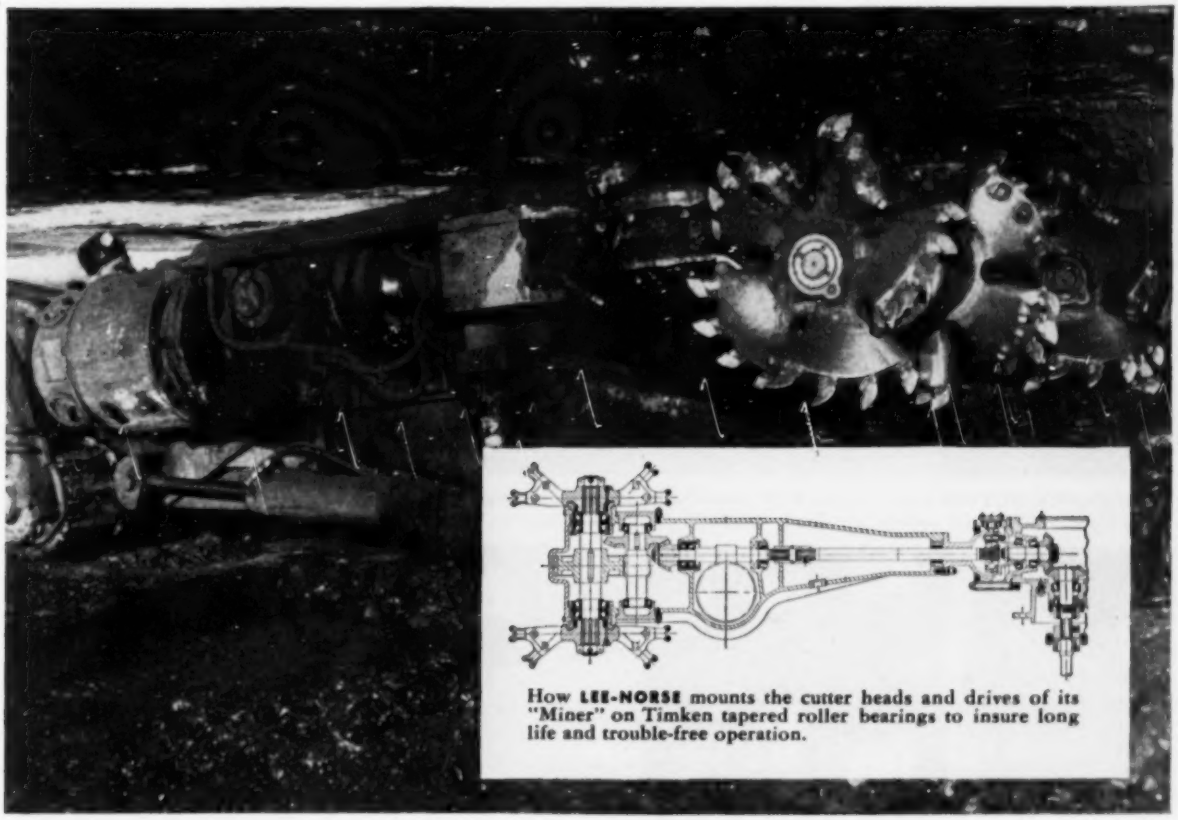
THIS LEE-NORSE continuous "Miner" stays on the job day in, day out with minimum time-out for repairs. The 64 Timken® tapered roller bearings help make sure of that.

The heavy shock loads set up by high speed cutting are handled with ease by Timken bearings. Rollers and races of Timken bearings are case-hardened to give them tough, shock-resistant cores and hard, wear-resistant surfaces. And line contact gives Timken bearings extra load-carrying capacity.

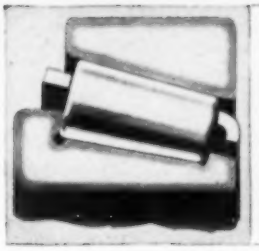
Particularly important for mining machines, working under a constant stream of coal, are effective closures. Timken bearings help make closures more effective by holding housings and shafts concentric. Lubricant stays in—dirt and coal dust stay out. Maintenance costs are cut.

Timken bearings give you more advantages than any other bearing. Be sure to specify them in the equipment you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **LEE-NORSE** mounts the cutter heads and drives of its "Miner" on Timken tapered roller bearings to insure long life and trouble-free operation.



HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

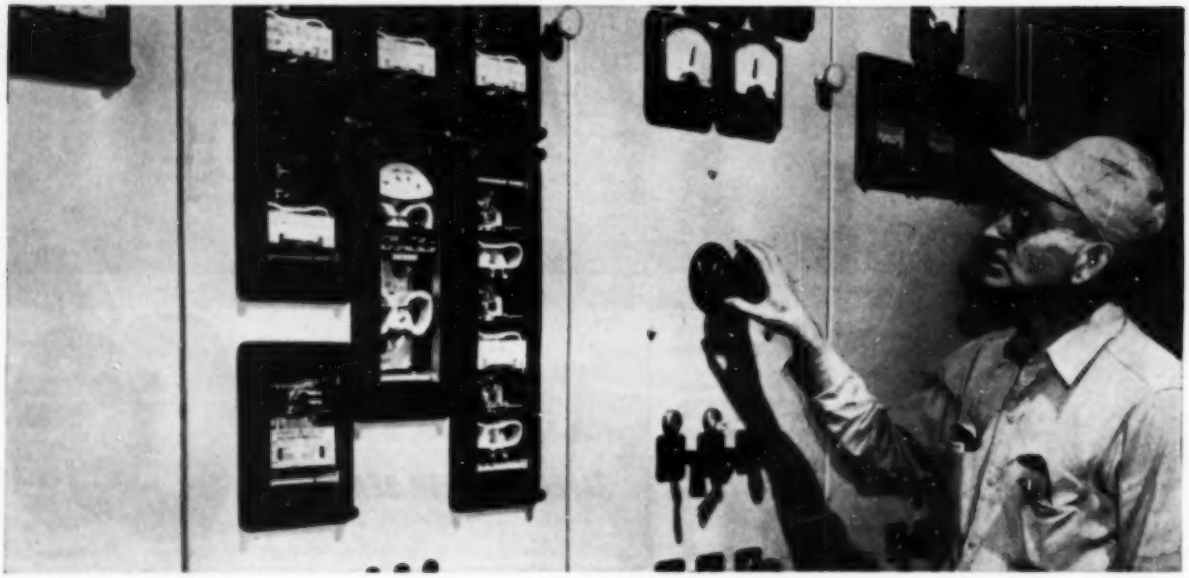
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

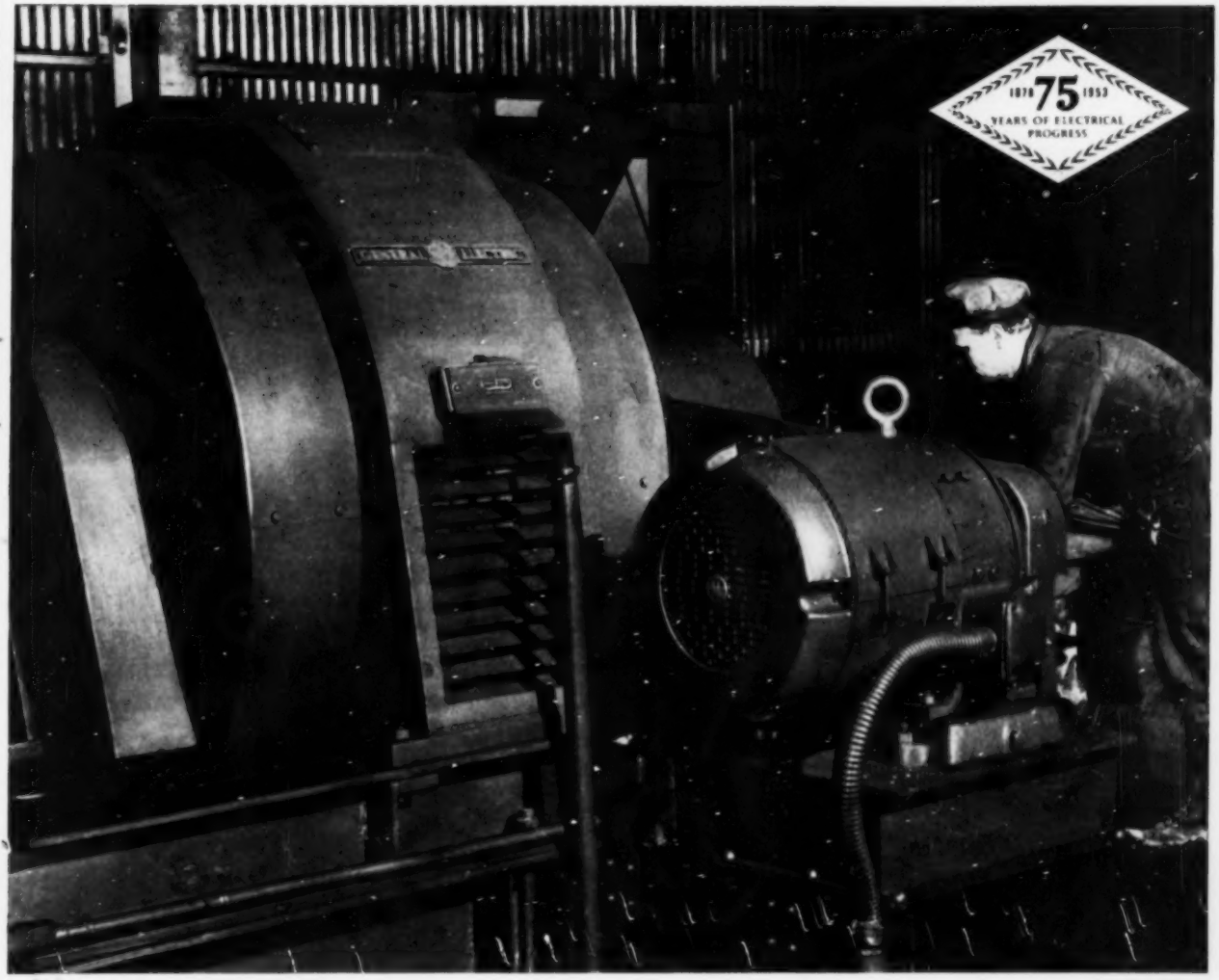
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

HIGHEST-LIFT CONVEYOR hauls coal up a 16-degree slope to preparation plant at C. W. & F.'s Orient No. 3 Mine. A G-E drive moves the 42-in. wide belt 625 feet per minute, handles 1200 tons per hour.



CENTRALIZED CONTROL—middle cabinet controls conveyor motor; cabinet at right controls motor when driven as generator.



EASY-TO-MAINTAIN 1500-hp synchronous motor powers belt—may also be used as diesel-driven generator for stand-by power.

Record conveyor powered by G-E drive

WORLD'S HIGHEST-LIFT SINGLE-BELT CONVEYOR is located at the Chicago, Wilmington & Franklin Coal Company's Orient No. 3 Mine in Illinois. This Link-Belt conveyor carries coal up a 16-degree slope—lifts 868 feet in one 3290-ft continuous flight. The 42-in. wide belt operates at 625 ft per min, handles 1200 tons per hour. A General Electric drive was chosen for this conveyor because: first, the reliability of the motor and control permits regulated starting and selected speed operation. Second, the synchronous motor has important power factor correction ability, and third, G-E system engineers helped co-ordinate the drive for easy starting, minimum maintenance, greater safety.

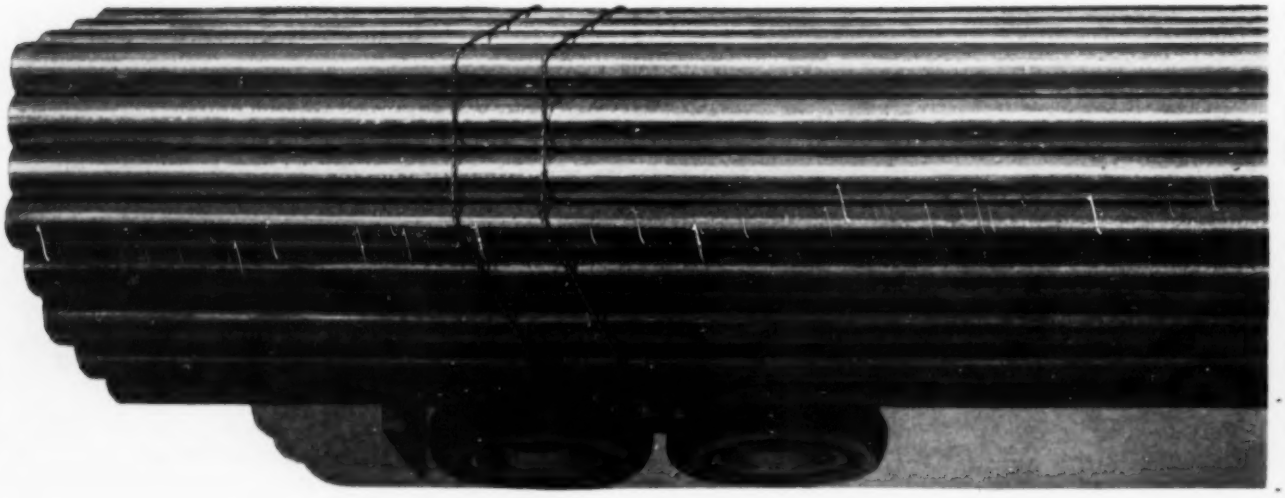
Another factor in the selection of a G-E drive for this unusual conveyor was G.E.'s many years of experience powering more conventional conveyors. This experience is at your service. Your nearby G-E Apparatus Sales Representative can tell you more. General Electric Company, Schenectady 5, N. Y.

Engineered Electrical Systems for Coal Mines

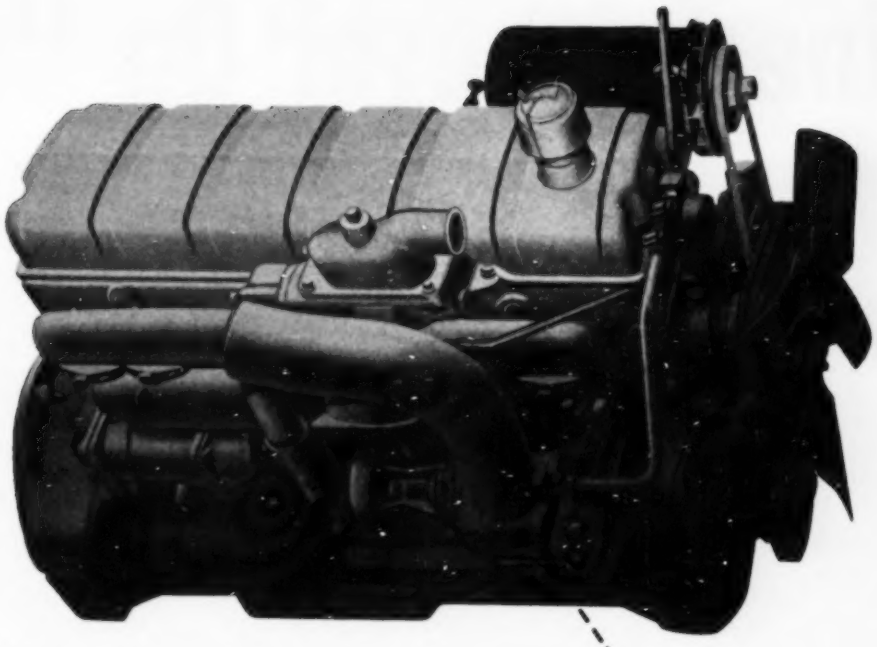
GENERAL ELECTRIC

Proven by 100,000,000 miles in medium heavy-duty trucks...

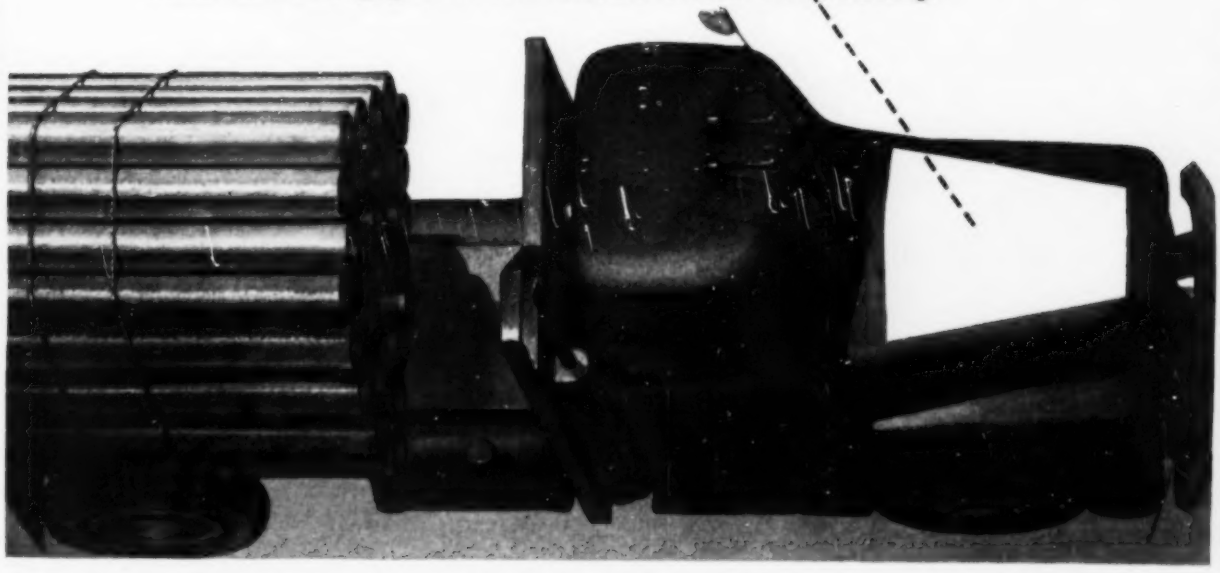
This 150 h.p. diesel will give you Cummins



CUMMINS



outstanding performance and economy



Under all kinds of operating conditions, the new Model JBS-600 has proved it can meet the needs of medium heavy-duty truck operators. It has the same features which have long made Cummins engines the standard of diesel quality—features formerly available only in heavy-duty trucks:

- 4-cycle design for ruggedness and long life.
- Exclusive Cummins fuel system for simplicity and economy.
- Operation on inexpensive No. 2 diesel fuel for minimum fuel costs.

Cummins JBS diesel power is offered by the following *leading* truck manufacturers: Autocar, Corbitt, Diamond T, Federal, Hendrickson, International Harvester, Kenworth, Reo and White.

See your Cummins dealer or representative of one of the manufacturers listed above.

Cummins® Engine Company, Inc. • Columbus, Indiana

Leaders in rugged, lightweight, high-speed diesel power [60-600 h.p.]

Decline Conveyor On the

HEWITT-ROBINS

EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Job for Over 24 Years

EQUIPMENT: Hewitt-Robins Decline Conveyor.

LOCATION: Reitz Coal Company, Mine #5, Windber, Pennsylvania.

MATERIAL HANDLED: 18" maximum size, r.o.m. lump coal.

PERFORMANCE: Probably the first declining belt conveyor to be placed in service, this unit was designed to handle bituminous coal at the rate of 100 T.P.H., down a decline of 112'-0", at a speed of 110' F.P.M.

RESULTS: Installed in 1925 this Hewitt-Robins belt conveyor provided over 24 years of dependable, trouble-free service. The original Hewitt-Robins belt did not need replacement until 1949; the original machinery is still in operation.

Engineering Data

LENGTH OF CONVEYOR: 710' center to center from end pullies.

WIDTH OF BELT: 36"

DECLINE OF CONVEYOR: 112'

. . . Belt Conveyor hugs the ground surface, in its travel.

CAPACITY: 145 T.P.H.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR OPERATION

CONVEYORS:
- ☐ —Belt
- ☐ —Dock
- ☐ —Mine
- ☐ —Shuttle
- ☐ —Slope
- ☐ —Vibrating
- ☐ —Fixed Tripper Shuttle

BELTING:
- *☐ —Elevator
- *☐ —General
- *☐ —Hot Materials
- *☐ —Raynile®
- *☐ —Steel Wrapper
- *☐ —Transmission
- ☐ —Woven Wire
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SCREEN CLOTH:
- ☐ —Electrically Heated
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VIBRATING SCREENS:
- ☐ —Dewaterizers
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HOSE:
- *☐ —Acid
- *☐ —Air
- *☐ —Air Drill
- *☐ —Fire
- *☐ —Pinch Valve
- *☐ —Servall®
- *☐ —Steam
- *☐ —Twin-Weld®
- *☐ —Water
- *☐ —Water Suction
- *☐ —Flexible Rubber Pipe

- ☐ MECHANICAL FEEDERS
- ☐ STACKERS
- ☐ CAR SHAKEOUTS
- ☐ TRIPPERS
- ☐ BELT CLEANERS
- *☐ GROOVED PULLEY LAGGING
- ☐ CRUSHERS
- ☐ PICKING TABLES
- ☐ LOADING BOOMS
- ☐ RUBBERLOKT® BRUSHES
- ☐ MOLDED RUBBER PRODUCTS
- ☐ DESIGN AND CONSTRUCTION OF COMPLETE MATERIALS HANDLING SYSTEMS

*For immediate information about these industrial rubber products, call your Hewitt Rubber Distributor (See "Rubber Products," Classified Phone Book.)

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

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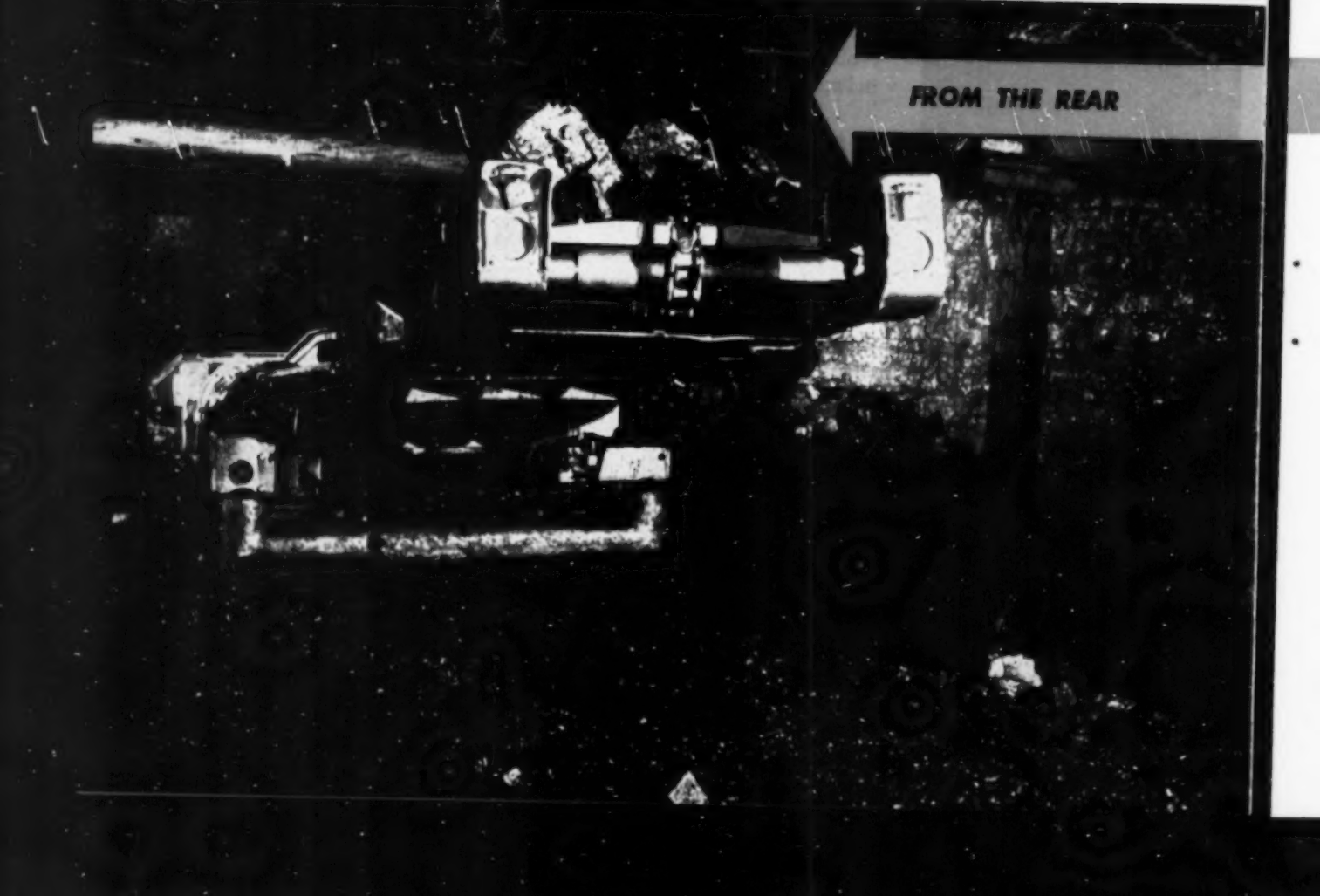
FROM THE FRONT


FROM THE REAR

THE *SUPER* 14-BU LOADER

No matter how you

look at it, or what comparisons

you make—here's the truly *SUPER* loader for medium-low coal

If you'll keep in mind that the Joy 14-BU has long been the world's most widely used loader . . . and that more coal is loaded by 14-BU's in medium-vein mining than by all other loaders combined—then you'll have a clearer picture of the improvements that Joy engineers have built into this year's *SUPER* 14-BU Loader.

Starting with the simplicity of design and unmatched durability that made the 14-BU so popular, the *SUPER* 14-BU is bigger, faster and more powerful than ever. Here are some of its principal advantages:

1. *Horsepower—increased from 40 to 65 HP.*
2. *Peak Loading Capacity—20% greater.*
3. *High Tramming Speed—increased from 88 to 125 FPM.*
4. *Mechanical and Electrical Components—all increased in size and strength to match the increased motor HP.*
5. *Machine Weight—about 900 lbs. more.*
6. *Heights—unchanged at 30½", 33" and 36", just what the doctor ordered for mining in seams from, say, 36" to 60" thick.*
7. *Conveyor Chain Speed—increased about 30% to more than 300 FPM. Stronger Conveyor Chain, too—with 45% greater tensile strength.*
8. *Maintenance Costs—reduced by providing oversize horsepower motor, wiring and electrical contactors, etc.*

Add extra advantages like those to Joy's famous gathering mechanism and exclusive Magnetax control—features that have been field-proved in every coal mining area in the world—and you have the kind of easy-operating, heavy duty, high production loader that means increased tonnage and reduced costs for you.

● Let us show you what *SUPER* 14-BU Loaders or other Joy Mechanized Equipment can do to improve your profit margin! **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

JOY

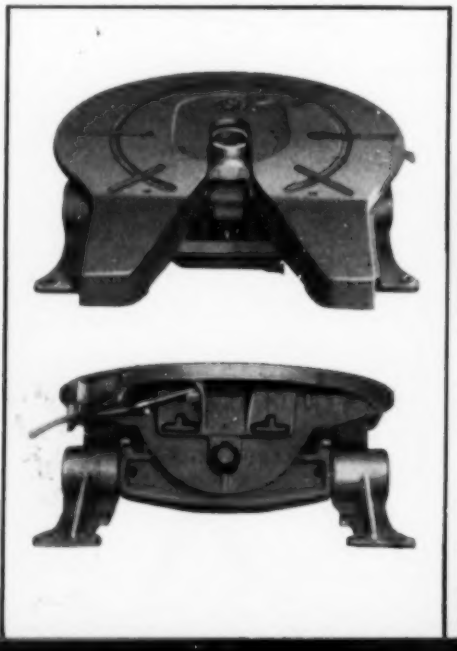
WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Marion shovel, loading a 34-ton coal payload into one of 23 Austin-Western trailers powered by Dart tractors. Scene is at Midland Electric Coal Corporation's strip mine near Farmington, Ill.

ASF Safety 5th Wheels have to be tough to stand up in this heavy-duty service, especially during wet weather when tractors are needed at each end of the semi to get it out of soft ground. Because ASF 5th Wheels are so easy to uncouple, in effect Midland has a *flexible pool* of load-carrying equipment and motive power, rather than 23 separate units. The result is fuller, more efficient use of available equipment.

Back and turn on a dime—In addition to quick interchange between motive power and load-carrying equipment, the tractor-trailer is highly maneuverable. ASF 5th Wheels are side-oscillating: even a full load can be safely and easily jackknifed for a short turning radius.

Heart of the semi—the ASF 5th Wheel—36" extra-heavy-duty ASF Safety 5th Wheel made for the rugged service and heavy loads found in off-highway work. Note the heavily reinforced plate; the massive "I" section center beam; the extra-strong mounting brackets.



He speaks through firsthand experience—M. R. Heckard, Superintendent of Equipment, has used ASF Safety 5th Wheels on all semi's for 11 years. He particularly likes the comparatively new 36" wheel shown at left; feels it will cut maintenance costs to a new low.

The Midland Electric Coal Corporation proves that your best investment for efficient tractor-trailer operation is an ASF Safety 5th Wheel . . .

"Best of all—they're easy to uncouple"

Ease of uncoupling is one of the big reasons why ASF Safety 5th Wheels are standard equipment on the fleet of semi's at Midland Electric Coal Corporation's strip mine near Farmington, Ill. M. R. "Marty" Heckard, Superintendent of Equipment, says:

"We use ASF 5th Wheels on all our semi's, and each wheel takes a real beating during the loading and hauling of a 34-ton payload around 30 times a day.

"One of the main reasons why we like these 5th Wheels is because they are easy to keep free of slack. We just add a shim usually once a year.

"Best of all, however, they are easy to uncouple in a matter of minutes. We can easily shop the tractor for maintenance without the trailer, or vice versa. Working on one at a time makes servicing easier, and we avoid tying up the whole semi."

Quick interchange berween motive power and load-carrying equipment is a real asset in mining and quarry work. And there's no denying that you get it with a tractor-trailer. But a 5th wheel—or any hitching device—tends to defeat its purpose if it's hard to uncouple.

Easy uncoupling can save you time, trouble and expense, as it has in this modern strip mine operation. But, it's equally important to know that the ASF Wheel *only uncouples when you want it to uncouple.* This is no beefed-up highway wheel. It's made specially for heavy-duty off-highway service, from the "I" section center beam to the side-oscillating plate that absorbs the sidestrain of uneven roadway. Until a twist of the wrist releases the king-pin, it's built to *stay* coupled—come shocks, strains or high water!

Get the facts on the best 5th wheel investment you can make! See your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever and safety latch—which can *only be in these positions* when the jaws are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety latch up, and pull the lever forward.

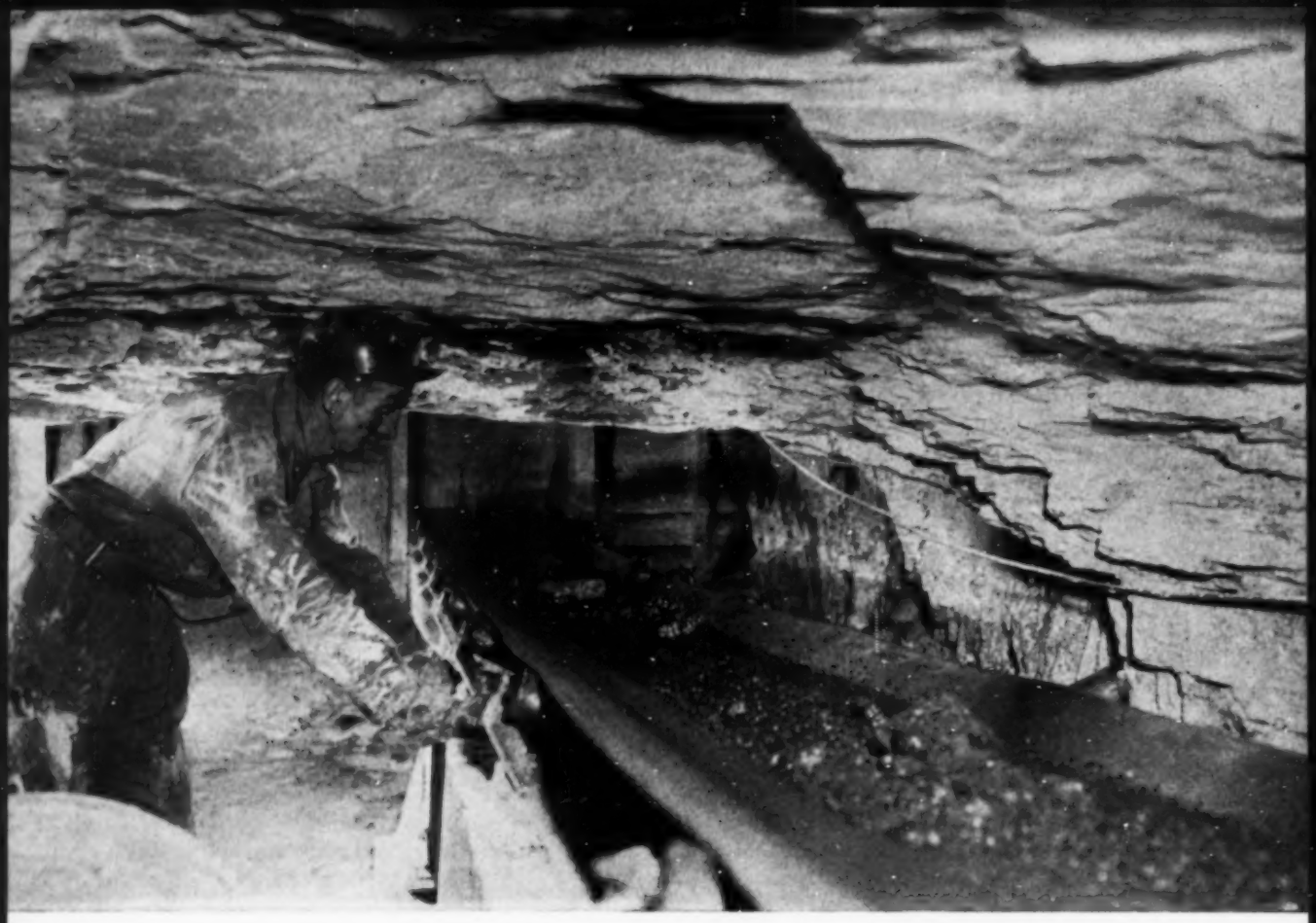
UNLOCKED—ready for uncoupling; parts in lockset position. *Handle can only move back to locked position when the jaws are locked in the next coupling operation!*

A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING—as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING—3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.



Buchanan County Coal Co. reports: 1600-ft. belt reinforced with "Cordura" handles 16-hour-per-day production with minimum maintenance

View of belt reinforced with "Cordura" at discharge end. One motor is all that is required to move entire mine production to loading point. Operators report a great increase of efficiency over the old method of mine-car loading.

Operating continuously for 16 hours per day, the conveyor belt shown above carries coal and bituminous by-products from the face of the mine to the mine cars. The belt, manufactured by Raybestos-Manhattan, Inc., gets its stretch-free strength from Cordura* reinforcement. Although the belt line is level, at times the floor has raised in places, putting great stress on the belt. Operators of the Buchanan County Coal Company, Big Rock, Va., report, however, that the conveyor belt reinforced with "Cordura" has stood the strain without trouble. It has been in service over four years, requiring practically no maintenance.

Engineers report better troughing and training when belts are sinewed for strength with Du Pont "Cordura". And the low stretch of "Cordura" means less downtime for take-ups, resplicing. Loaded or empty, these belts ride firmly on the center idler.

Find out more about the advantages of belts reinforced with "Cordura". Write for names of suppliers, and for your copy of the free booklet: "Sinews for Industry". Address: Textile Fibers Dept., Room 2520-C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

Watch "CAVALCADE OF AMERICA" *on Television.*

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

THIS IS FOR YOU!

Your problems become the projects in the Mc Nally Research Laboratory

FIRST . . . to receive large samples of your coal for testing. The testing involves washability in terms of size distribution, ash content, moisture content, BTU, and sulphur content.

Much of the testing equipment is full size so that the operation is identical with an actual coal preparation plant.

SECOND . . . to assist our engineers and designers to continually develop better and better coal preparation equipment for your use.

Both activities of this laboratory are to help you up-grade your coal to premium quality . . . to enable you to determine whether or not you are equipped to operate at a satisfying profit.

In this laboratory, "the men who know Coal from the ground up" carry on their never-ending search for improved methods of making coal a better fuel.

Running a sulphur test for a coal operator in the coal research laboratory of McNally Pittsburg.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNALLY PITTSBURG MFG. CORP.
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio • Engineering & Sales Offices: Pittsburgh • Chicago Rio de Janeiro • Pittsburg, Kansas Wellston, Ohio

FIRST CLASS
PERMIT No. 93
(Sec. 34.9, P. L. & R.)
PITTSBURG, KANSAS

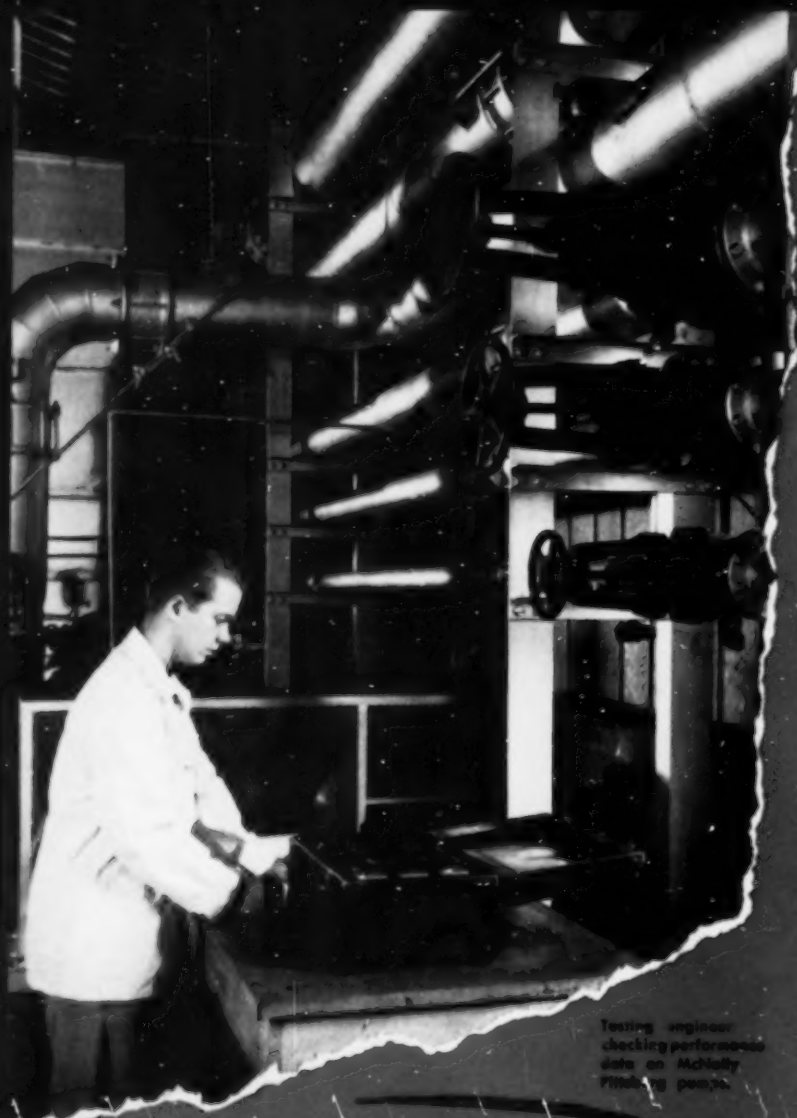
BUSINESS REPLY CARD

NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

4c-POSTAGE WILL BE PAID BY—

McNally Pittsburg Mfg. Corp.

PITTSBURG, KANSAS



Testing engineer checking performance data on McNally Pittsburg pump.

MAIL THIS CARD

The attached prepaid postage mailing card will facilitate giving us information needed to schedule a test in the McNally Research Laboratory.

We are interested in the possibility of up-grading the ____ x ____ size ranges of the coal at our No. ____ Mine located at ____ This coal is from the ____ seam.

We are at present producing a raw / washed coal containing:

____ % Moisture
____ % Ash
____ % Sulphur
____ BTU per pound

We should like to produce coal containing:

____ % Moisture
____ % Ash
____ % Sulphur
____ BTU per pound

Name ____ Title ____

Company ____

Address ____

City ____ State ____

You can put this lab to work for you to solve these problems

1 ***The up-grading possibilities inherent in your raw coal.***

For example, in a recent laboratory test, the coal went in at 9000 BTU. When the moisture, sulphur, ash, and other noncombustibles were removed, the test revealed an up-graded product capable of producing 13,000 BTU. That was a revelation to the coal operator!

2 ***The equipment best suited to achieve results.***

We are not biased in our judgment as we design and build equipment to wet- or dry-wash coal . . . and drying equipment that employs the thermal or centrifugal drying principles.

3 ***How to get into the premium markets and stay there.***

That is the sixty-four dollar question. It's the same for large or small tonnage operators and McNally Pittsburg has the answer! In over 200 preparation plants built by McNally not a single one has shown a profit-failure. Most of these plants now in operation are enjoying unanticipated contracts because of their present facilities.

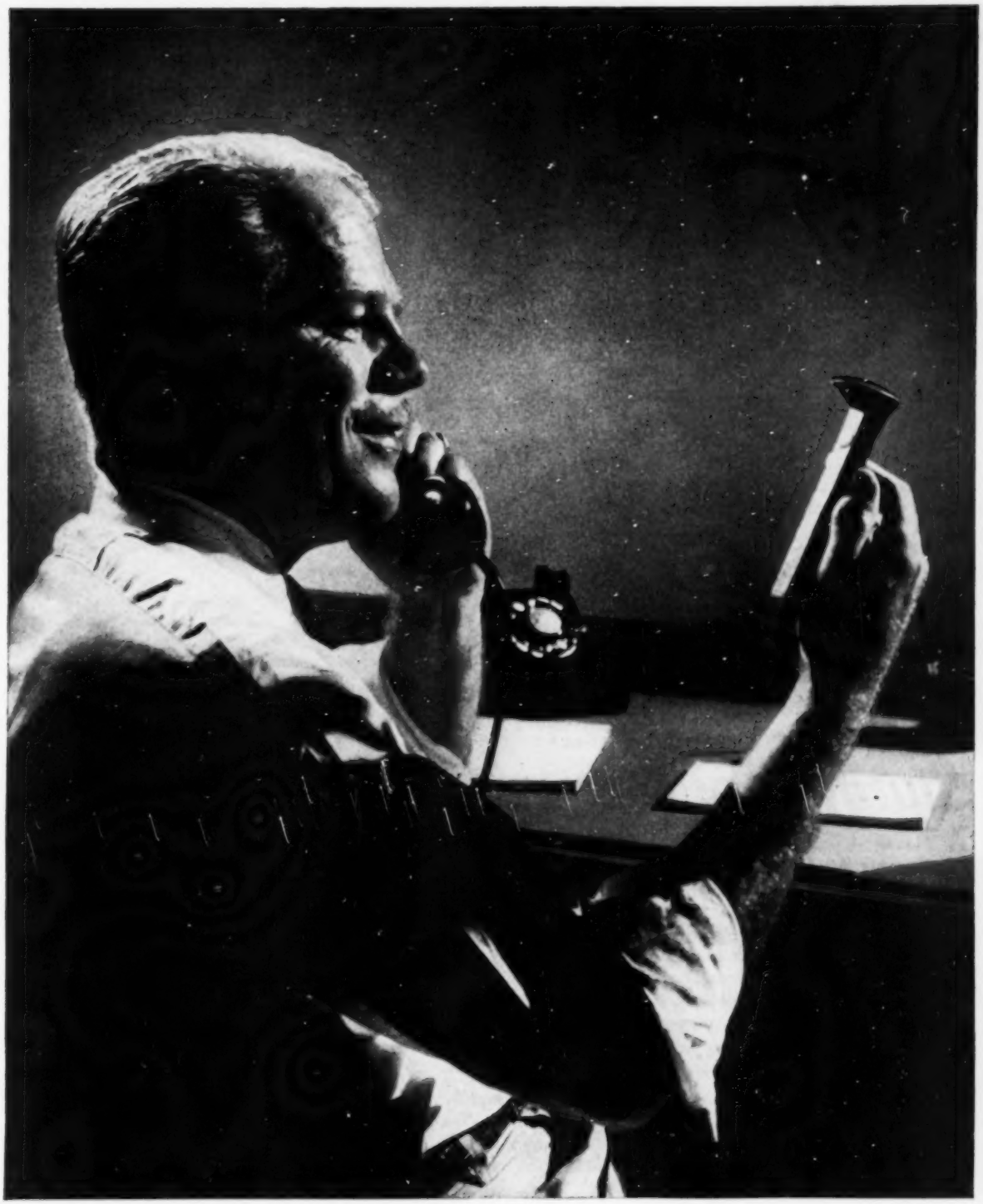
If you don't know the full potential of your coal, have a test run made now. It's the first step in preparing to insure your future in markets with long term contracts.

To arrange for the test fill in the attached card or write us a letter.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNALLY PITTSBURG MFG. CORP.
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio • Engineering & Sales Offices: Pittsburgh • Chicago Rio de Janeiro • Pittsburg, Kansas Wellston, Ohio



"That's right, Pete . . . Bethlehem Spikes, same as before.

They've got the good, sharp points that trackmen like."

BETHLEHEM STEEL

...for *Dependable*, continuous loading operation

Sturdy! Easily moved!

Brownie Model HSD Hydraulic Car Spotters are advantageously used to move trips of mine cars where loading rates are high and it is desirable to avoid stoppages for changing trips. Trips are moved forward by two trains of barneys arranged side by side and operated sequentially by hydraulic cylinders. These multiple, short-stroke barneys eliminate the need for holding dogs and prevent excessive shock and delay in movement where cars of mixed lengths are handled . . a definite advantage in speeding operations.

Easy to move, HSD Hydraulic Car Spotters are rapidly installed by placing and anchoring the trough-like guide frame on the ties between the rails of any standard mine track. In minimum time the installation is complete and ready for use.

MODEL HSD GENERAL SPECIFICATIONS

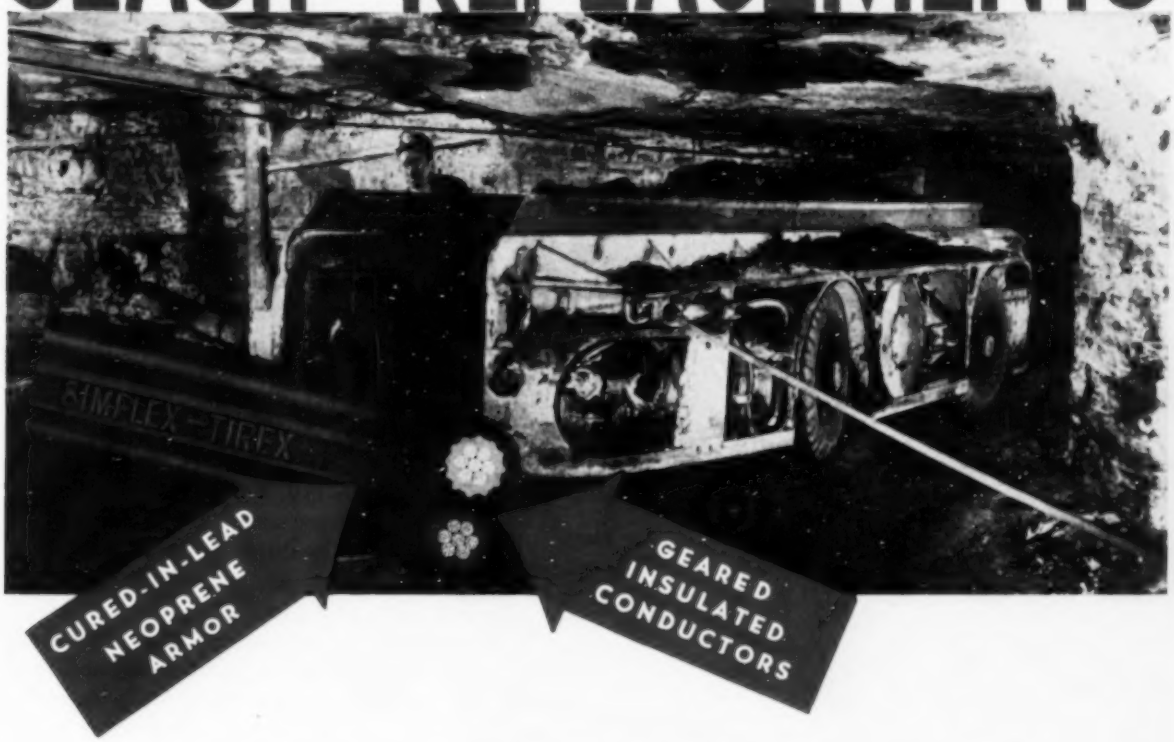
Available in 3 Motor Sizes
Drawbar pull.....18,000 to 24,000 pounds
Average Speed ..... 33 or 40 fpm
Power Unit: 31" high, 30½" wide, 110½" long
Track Unit Length .....to suit mine cars
Motors: General purpose, drip-proof, DC or AC. Motors and pumps are 1150 RPM, suitable for usual mine voltages.

SPEED LOADING . . . . USE HSD HYDRAULIC CAR SPOTTERS

THE BROWN-FAYRO COMPANY

JOHNSTOWN, PENNSYLVANIA

SLASH REPLACEMENTS



Your production profits depend upon day-in and day-out performance without shutdowns for repairs. TIREX Shuttle Car Cables will give you this kind of performance by curtailing replacements and lowering maintenance costs.

TIREX Shuttle Car Cable has the only insulated conductors that are "geared" to firmly interlock with the jacket. The conductors offer exceptional resistance to twisting inside the jacket. They can withstand crushing pressures and the continual strain of reeling and unreeling as the shuttle car moves about the mine.

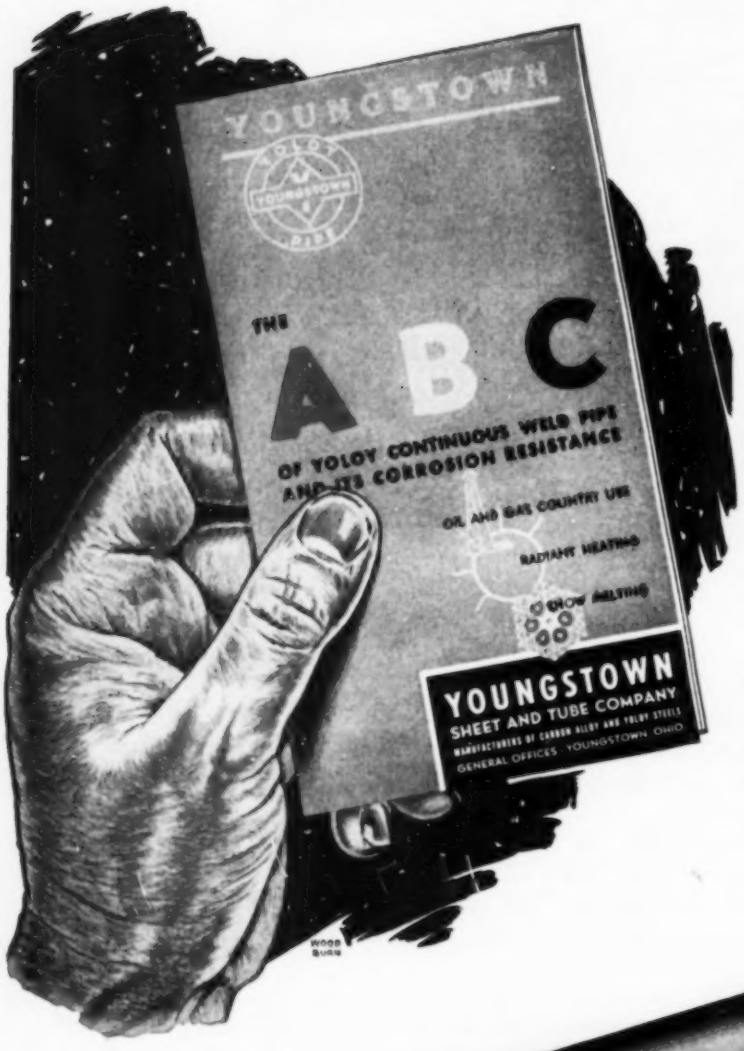
The famous TIREX neoprene armor is "cured in lead" to offer superior protection against the many hazards of mining operations. It provides abrasion resistance and snagproof service with excellent resistance to acids, grease, oil and flame.

For service that means safety, economy and dependability, specify and get Simplex-TIREX Shuttle Car Cables. They keep down costs and help increase output. Our catalog "Simplex Cables for Mining" will tell you about the many other Simplex cables for mining use. Write for a copy today in care of the address below. No obligation of course.

Simplex - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 SIDNEY STREET,
CAMBRIDGE 39, MASS.

This DATA may solve YOUR piping problem



● Here is the up-to-date story of Yoloy Continuous Weld Pipe—a remarkable low alloy steel whose nickel-copper content gives it unique ability to withstand corrosion, abrasion and shock. These outstanding advantages combined with high strength, ductility and weldability make Yoloy Pipe an excellent selection.

Proved by 18 years of satisfactory performance, Yoloy is highly recommended by users in such service as radiant heating, snow melting, gas line gathering, brine lines and other industrial piping.

This new folder presents the facts and figures on Yoloy's physical and chemical properties, with data on sizes now available and other information you'll need to select Yoloy Continuous Weld Pipe to meet your special requirements. Write for a copy today.

Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices — Youngstown 1, Ohio

Export Office - 500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS · ELECTROLYTIC TIN PLATE · COKE TIN PLATE · WIRE · PIPE AND TUBULAR PRODUCTS · CONDUIT · RODS · SHEETS · PLATES · BARS · RAILROAD TRACK SPIKES

MANEUVERABLE NEW G-E POWERED TRUCK IS HANDY IN TRACKLESS MINING SYSTEMS

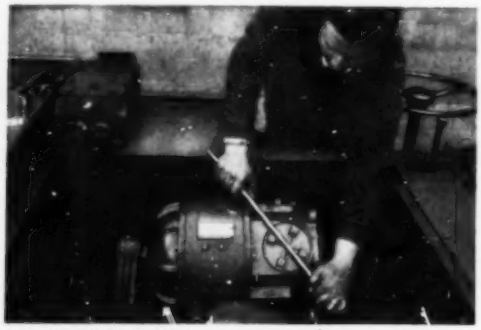
Easy-to-maintain motors power new mine truck

New G-E mine motors applied by Lee-Norse can be serviced quickly right on the trucks

Here's a typical use by mining machinery manufacturers of General Electric's new easier-to-maintain d-c mine motor. The Lee-Norse Co. of Charleroi, Pa., is using it in its versatile new service truck. This vehicle simplifies and speeds servicing of trackless mining sections.

Here's why Lee-Norse chose G-E mine motors: New two-stud construction makes all brushes easier to get at for inspection without dismantling motor or taking it off the truck—a big selling point with customers. Motor's compactness, with no part extending beyond its normal width, saves space within the truck—a big design point with Lee-Norse. And we'd be glad to show you 19 other reasons why this motor is easier to maintain, longer lasting, easier to install!

Whether *you* build motor-driven mining equipment, or order your own motors for your mining machines, check all the facts about this new, easiest-to-maintain G-E mine motor ever built. Ask your G-E Apparatus Sales Representative, or write for Bulletin GEA-5553 to General Electric Company, Section 663-36, Schenectady 5, N. Y.



NO SPECIAL TOOLS are needed to open one-piece hand-hole covers. They are easily screwed in or out of the motor—without disturbing the fan housing.

WIDE-OPEN ACCESSIBILITY to brushes—through only two instead of four openings—is provided by locating them all on the upper half of the commutator.

You can put your confidence in—

GENERAL ELECTRIC

Crane rental company **increases safety** with these

Improved Tiger Brand Boom Supports

The new Tiger Brand Boom Supports on this 25-ton Cranemobile can be inspected visually, because there are no sockets to hide part of the rope. What's more, interwoven ends distribute vibration over a longer part of the rope —keep these improved boom supports in safe operating condition 2 to 3 times longer.

Last year, Lee Crane Service, Inc., Boston, Mass., added an extra measure of safety to every one of its 14 truck cranes. It removed apparently sound—but potentially dangerous—boom supports equipped with ordinary zinced sockets and installed new Tiger Brand Boom Supports.

Visual inspection now possible

Here are the reasons for this change, as told by Mr. Joseph Veanor, owner of Lee Crane Service: "Easy *visual* inspection is the reason we switched to Tiger Brand Pendants. With the old zinced-socket type, we could never be positive that a pendant was completely safe because the sockets hid part of the rope.

"These Tiger Brand Pendants completely eliminate the use of sockets. As a result, we can see and inspect *every* part of the rope. If any wires are broken, we can replace the pendant before a failure occurs. In that way, we can be sure that every one of our booms is completely safe."

Last 2 to 3 times longer

Tiger Brand Boom Supports last longer than the old-fashioned socket type, because each end of the wire rope is tightly and permanently interwoven. This spreads strain and vibration over a much longer section of the rope, instead of concentrating all the strain right at the socket. As a result they last 2 to 3 times longer than other types.

Easily installed

Lee Crane Service had no trouble converting to these modern Tiger Brand Boom Supports. All fittings are standard size, so no alteration of equipment was required.

Send the coupon for more information on these improved boom supports. Or get in touch with our nearest sales office.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN AUTOMOTIVES
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE USS *Excellay Preformed*

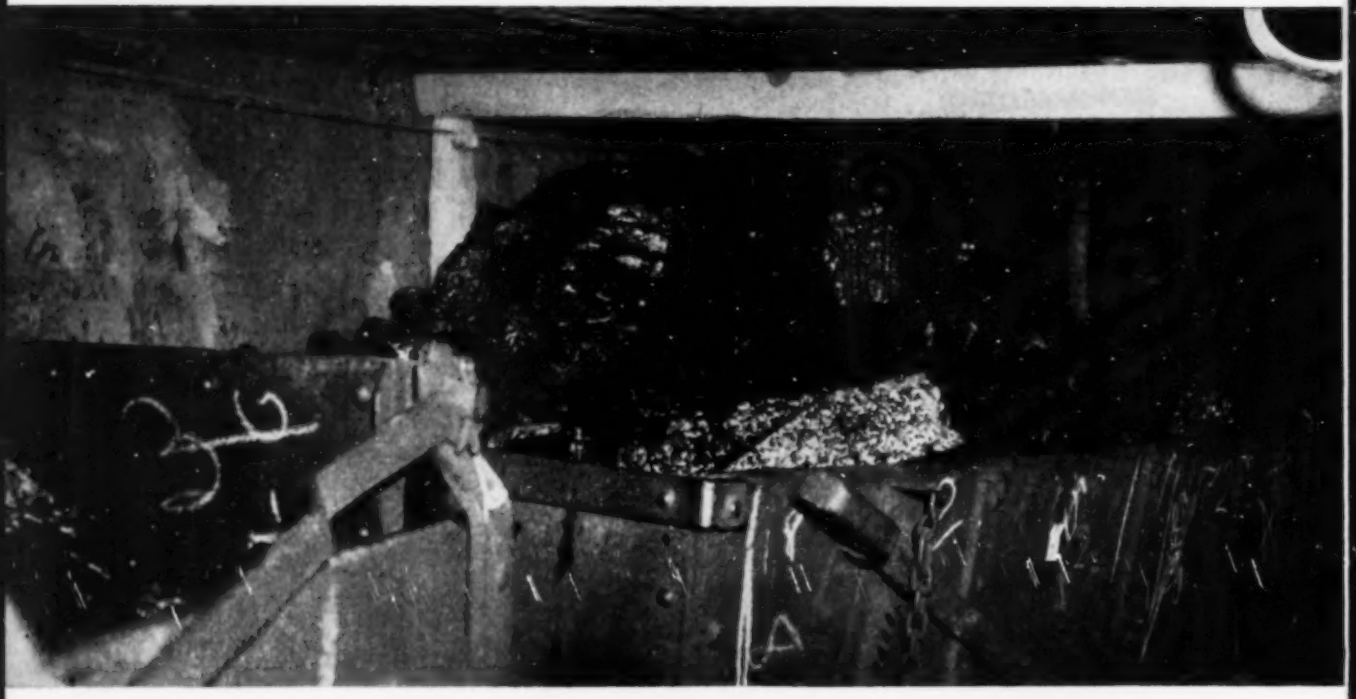
American Steel & Wire
Rockefeller Building
Cleveland 13, Ohio

Please send my free copy of your descriptive folder on Tiger Brand Wire Rope Boom Support Assemblies.

Name.....
Company.....
Address.....
City.....Zone.....State.....

UNITED STATES STEEL

Heaving action of Du Pont "MONOBEL" AA



helps you load out more lump coal—*faster*

Foremen in many coal mines agree that Du Pont "Monobel"® AA is the most satisfactory permissible they've ever used. Its high density and low velocity create a heaving action that shears back and ribs and puts the coal where mechanical loaders can readily get at it. It's an excellent permissible for high, hard-shooting seams.

In addition, "Monobel" AA has exceptional water resistance and is ideal for top or bottom shooting even in the wettest of mines. Minimum smoke and fumes permit quick return to the face . . . saving time and costs.

Because "Monobel" AA enables so many mine operators to load out more top-grade, firm, coarse lump coal—*faster*—it has become the world's largest-selling permissible.

Ask the Du Pont Explosives representative in your district for complete information about this popular, widely used permissible . . . and for assistance with any problem of blasting you may have. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT PERMISSIBLES

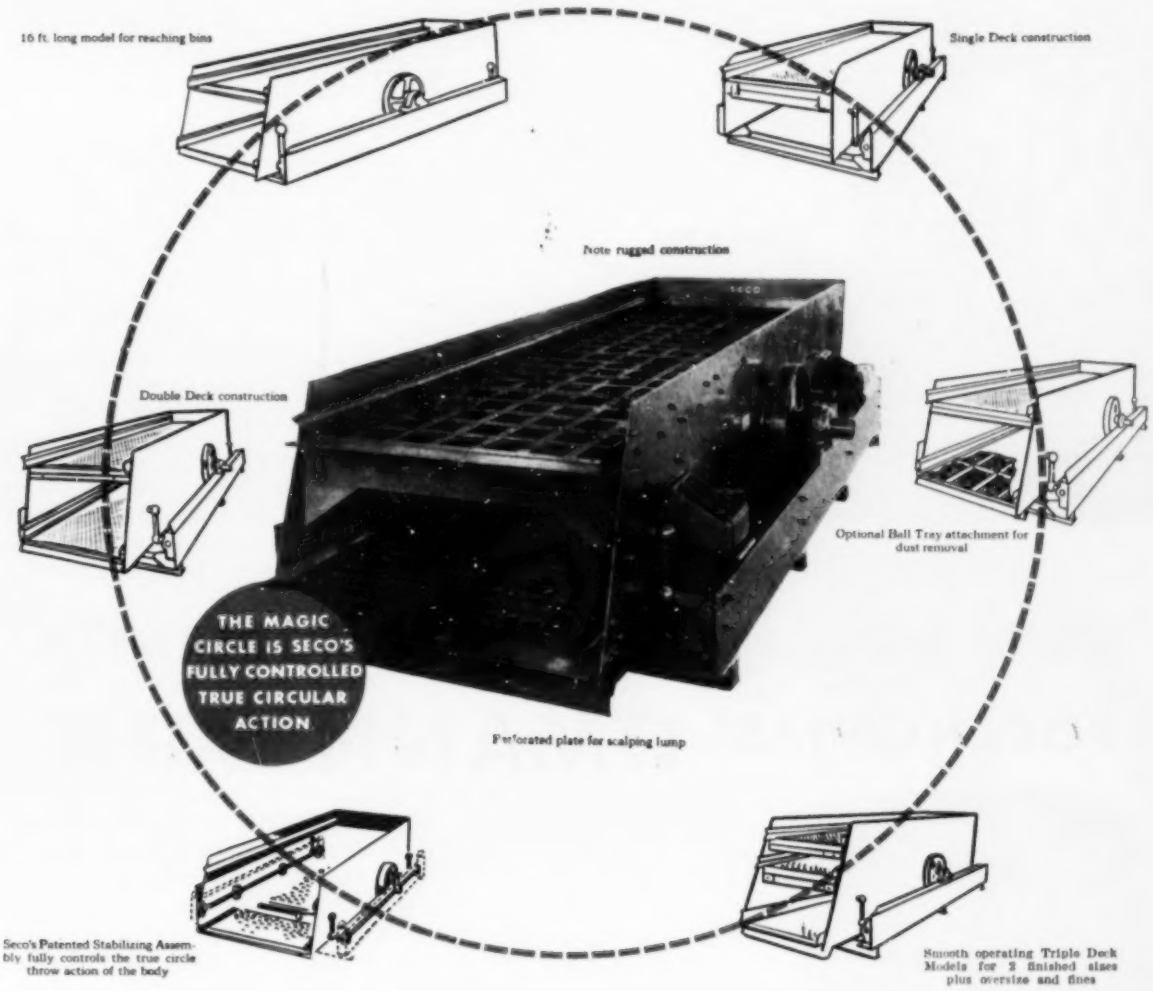
Blasting Supplies and Accessories

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

HERE'S THE "*MAGIC CIRCLE*" FOR CLEAN COAL IN THE WANTED SIZES



Hundreds of Coal Operators Attest to the Accuracy and Dependability of Seco Vibrating Screens

Today, screening R. O. M. into sizes to meet the market's demands, is no longer considered an extra cost of operation, *but* a sound business practice that actually *ups* profits for progressive operators. That's where Seco screening equipment fits into the modern coal preparation picture. The proved smooth operation and long life of dependable Seco vibrating screens are paying off in more profits per ton for hundreds of operators.

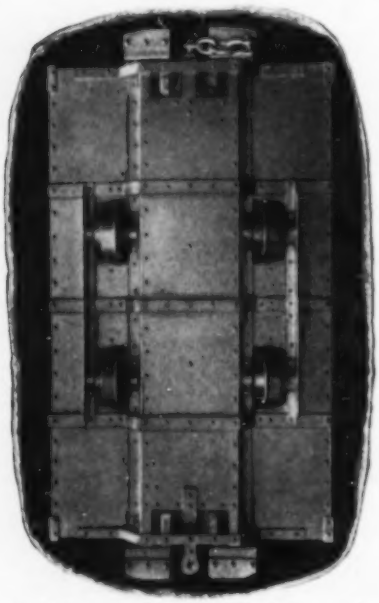
Are you in the "magic circle"? If not, why lose dollars waiting . . . Get the facts on Seco low cost per ton cleaning and sizing today! Write for new Coal Bulletin #53.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

SCREEN EQUIPMENT CO., INC.
1750 Walden Ave., Buffalo 25, N.Y.

This scene at Itmann Mine shows one of the many heavy-duty turnouts on the all-Bethlehem haulage system. Bethlehem also supplied all steel ties, roof bolts and accessories used at Itmann.

HOW BETHLEHEM HELPED MODERNIZE POCAHONTAS' ITMANN MINE



Bethlehem built 400 of these modern, rugged, stub-axle cars for Itmann Mine to help bring out 700 tons of coal per hour.

IF you were to tour Pocahontas Fuel Company's Itmann Mine in Wyoming County, W. Va., you would be impressed by the up-to-the-minute character of this coal-rich property. And before you'd gone very far, you would doubtless be struck by the extent to which the operators had relied on Bethlehem products in their modernization program.

For example, you would ride in comfort over track laid with heavy Bethlehem rails. Overhead you would enjoy the protection of hundreds of Bethlehem Mine Roof Bolts holding the overlying rock strata in place, preventing roof-falls. And you would probably take siding on a precision-made Bethlehem turnout to let a train of coal roll by in sturdy Bethlehem Mine Cars.

Yes, Itmann Mine drew heavily on Bethlehem's experience in manufacturing track equipment, cars and accessories to bring its workings up to date. If your plans call for revamping or expansion, why not do the same?

BETHLEHEM STEEL COMPANY

BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

How to make your own Mine Roof Jacks

- *quickly*
- *economically*

Here's all you do—(1) cut any 2-inch standard steel pipe into lengths desired and (2) attach safe, strong, dependable Duff-Norton head, handle and base fittings. That's all!

You can choose the type of heads, handles and bases best suited to your particular needs. They are available in a variety of types in both 8 and 16-ton capacities (16 ton requires 2-inch *extra strength* pipe). All fittings are painted light grey for better visability.

For complete information on Duff-Norton Mine Timbering and Roof Jacks and Fittings see your local distributor or write the world's oldest and largest manufacturer of lifting jacks for your free copy of 8-page catalog, "A Handy Guide for Selecting Duff-Norton Mine Jacks That Meets Every Modern Mining Need." This catalog contains complete information not only on Mine Roof Jacks but other popular Duff-Norton Jacks for useful trouble-free service in and around coal mines. Ask for catalog AD-10J, The Duff-Norton Manufacturing Co., P. O. Box 1889, Pittsburgh 30, Pa. Canadian plant—Toronto 6, Ontario.

DUFF-NORTON *Jacks*

"Giving Industry A Lift Since 1883"

get DEEP-DOWN pulling

with Stearns Suspended Separation Magnets

CHECK THESE FEATURES

- ✓ Coil-wound for continuous duty. Special insulation and rib-type head casting assure fast heat dissipation.
- ✓ Leads and terminals fully protected against abrasion.
- ✓ Waterproof construction.
- ✓ Vacuum-impregnated windings assure long life and dependable operation.

A Stearns circular-type, suspended separation magnet provides a tremendous pulling force that reaches far down into material on conveyor lines — prevents the escape of deeply embedded tramp iron — protects crushers and other processing equipment from costly damage.

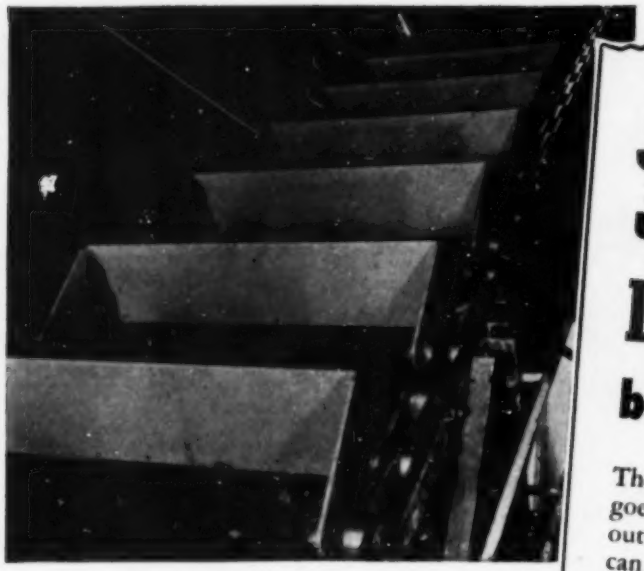
Stearns suspended separation magnets are available in sizes ranging from 16 to 65 inches in diameter. A postcard request places nearly 40 years of research and engineering experience at your disposal. Write today.

1059

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC. 661 S. 28 Street, Milwaukee 46, Wisconsin



Jeffrey Scraper Conveyor with two strands of rivetless chain.

JEFFREY
unit equipment
IMPROVES
both plant and product

The pay-off in today's tough coal market goes to the plant that consistently turns out top quality coal. Standard Jeffrey units can be fitted into any present operation — or a new one — to improve it profit-wise — as well as production wise. Two such units are shown. Engineer standard Jeffrey units into your next coal preparation plant job.

Jeffrey Loading Boom showing how car is loaded with minimum breakage on Jeffrey Steel Apron Conveyor.

TYPICAL JEFFREY UNITS

Scraper Conveyors	Rivetless Chain
Screw Conveyors	Steel Thimble Roller Chain
Dry and Wet Shaker Screens	Crushers
Compartment Conveyors	Vibrators
Belt Conveyors	Jigs
Bucket Elevators	Fans
Hinged Apron Conveyors	Cars
Transmission Machinery	Cutters
Belt Idlers	Locomotives
Loaders	Shuttle Cars
Loading Booms	Magnetic Separators

WRITE FOR CATALOG NO. 815-A

THE JEFFREY MANUFACTURING CO.
ESTABLISHED 1877
Columbus 16, Ohio
sales offices and distributors in principal cities
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

LONGER SERVICE-LOWER COSTS FOR YOUR WIRE ROPES!

BERCO'S "GUIDE TO SELECTING WIRE ROPE" WILL HELP YOU SPECIFY THE MOST ECONOMICAL ROPE FOR EVERY NEED

For every job there is one particular wire rope that will do the work better—last longer—cost less than any other. That rope carries the right factor of safety, but no more—it offers the right amount of resistance to bending, abrasion, crushing, impact, heat, corrosion.

All these conditions can be met only when the correct grade of wire, the proper rope diameter, the most suitable construction, lay and core are specified for the particular job involved. When you specify these details correctly you will have a wire rope that will give you the best possible service with less idle equipment time during repairs or replacements and lower overall labor costs.

Berco's "Guide to Selecting Wire Rope" will enable you to specify the correct details for every job. It is a concise outline in words and drawings of the most critical points in rope specification. With its help you can make substantial savings in your wire rope costs—get longer and better service.

Return the coupon today.

Wire Rope

CUT OFF ALONG THIS LINE

Bergen Wire Rope Company
14 Gregg Street
Lodi, New Jersey

BERCO WIRE ROPE

Gentlemen:

Kindly send me a copy of your brochure "Guide to Selecting Wire Rope."

Company_____

Address_____

_____

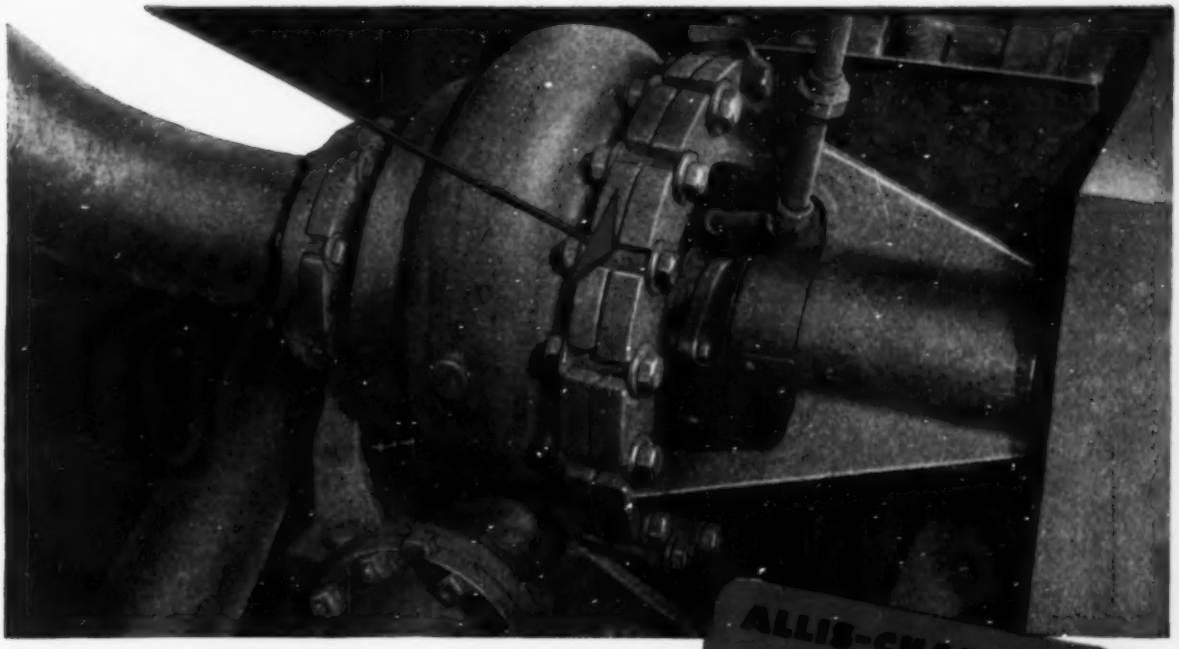
City_____ State_____

Signed by_____

Position_____

BERGEN WIRE ROPE COMPANY

Here's a Pump That Maintenance Men Like



ALLIS-CHALMERS
Coal Washing PUMP

- **All maintenance points are easy to reach**
- **Pump can be taken down and returned to service in less than a half hour**
- **Many parts are interchangeable between different pump sizes**

THE Allis-Chalmers coal washing pump is ruggedly built to stand rough coal washing service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

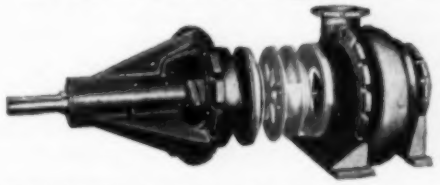
Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers coal washing pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

Complete Pumping Unit Furnished . . . Allis-Chalmers can furnish the complete pumping unit — pump, motor, *Texrope* drive and control — assembled and ready to install and run. A *Vari-Pitch* V-belt drive makes it possible to vary head and capacity at the turn of a crank.

Get the Complete Story . . . Every Allis-Chalmers coal washing pump is application engineered by a specialist who knows coal washing equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee 1, Wisconsin and ask for Bulletin 52B6381.

A-4136

NOW . . . even longer wear



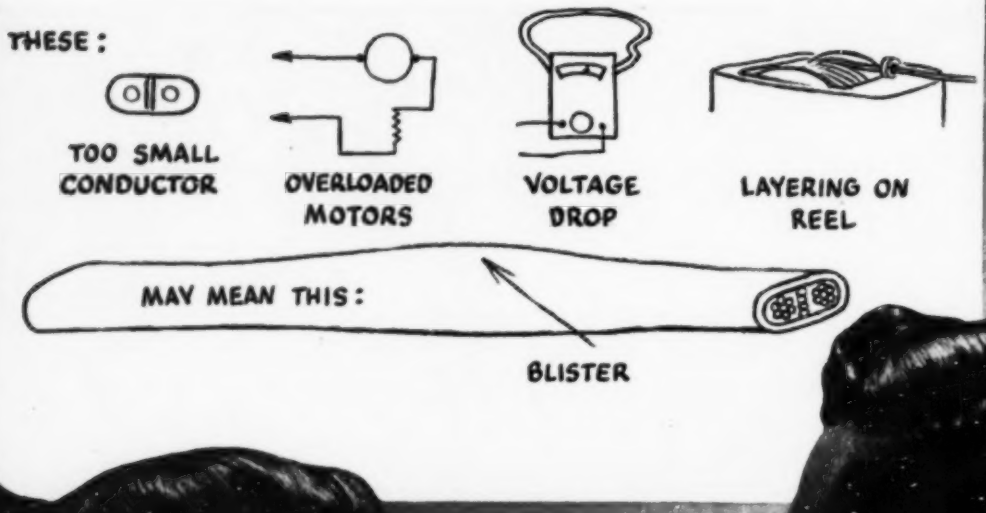
Impeller and suction plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear, lower pumping costs.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

HOW TO SPOT DAMAGE FROM CURRENT OVERLOAD . . .



. . . AND WHY THERE'S GREATER HEAT STAMINA IN ANACONDA'S NEW MINING MACHINE CABLE

Blisters, formed by gases from overheated insulation, are a sure sign of cable overloading. A torn cable may result. Since you can't always control overloads, it's important to choose *quality* cable.

Today, due to better design, jackets and insulation, good cables shouldn't cook on the reel the way they used to. But this only makes overloads harder to detect. They still may be present . . . caused by too small a conductor, overloaded machines, voltage drop or even layering of the cable. With 4 layers on the reel, according to I.P.C.E.A., unventilated bottom layers lose 65% of capacity.

WHY THE NEW ANACONDA CABLES ARE SAFER

First, they are more flame-resistant. Jacket is made from a new neoprene formula. Improved cold-rubber insulation gives greater heat stamina. Patented breaker strip* insures a safer ground. No ANACONDA Cable has ever failed a U. S. Bureau of Mines flame-test!

CABLE LIFE NOW MUCH LONGER

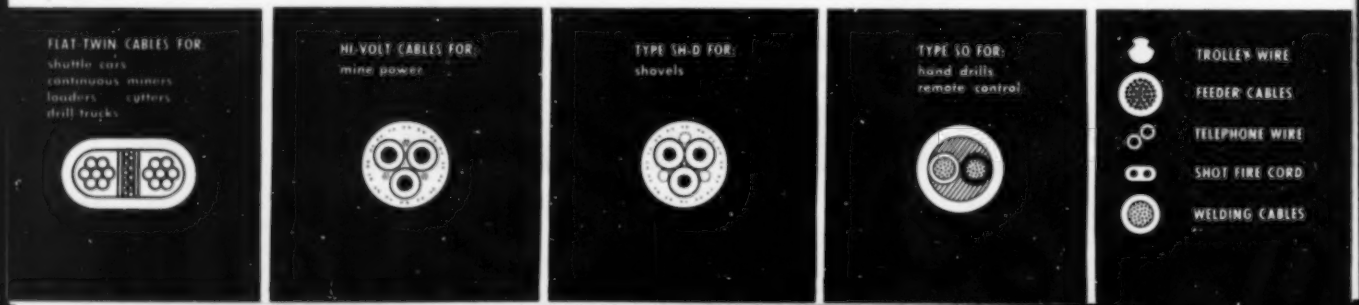
In 15 mines recently surveyed, ANACONDA Cables on shuttle cars are lasting up to 300% longer than cables made only a few years ago. Together, jacket and insulation protect these cables better – especially in wet mines where sliver-cuts can cause shocks. The cables are tougher. New-type stranding flexes better under tension.

All this means economy because *one* break in cheap cable costs more than you can save by buying on price. For a sample of this new cable, call your Anaconda Sales Office or Distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 53302

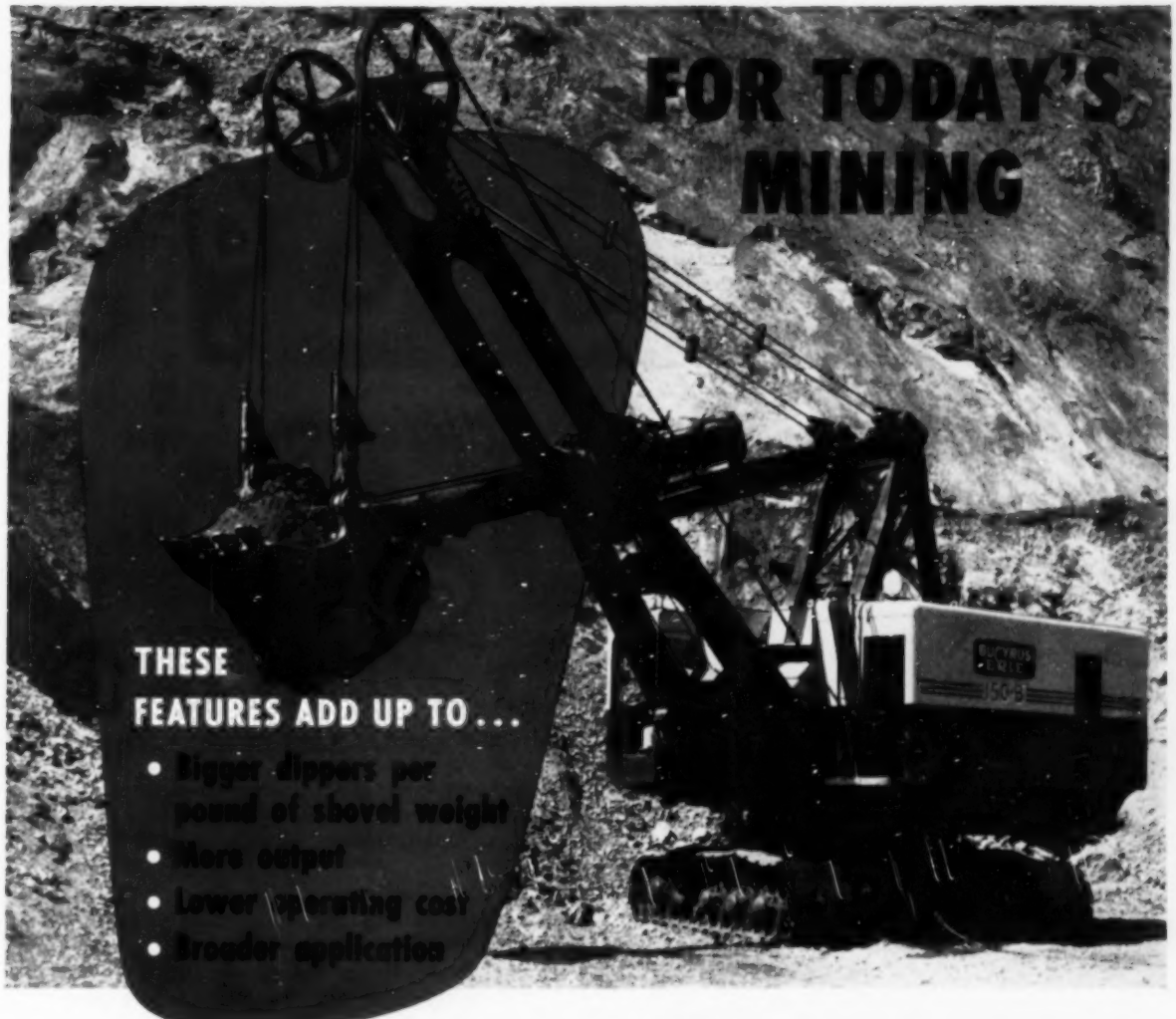
ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

*U. S. Patent No. 2,455,773



Tomorrow's Shovels



Bucyrus-Erie's progressive design brings the modern shovel front end to the mining industry.

Only Bucyrus-Erie offers these features in front end equipment on mining shovels.

BOOM — Two section — light upper section, rugged lower section. No excess weight. Weight and strength concentrated where needed and close to center of rotation.

Lower boom section part of main machine, through twin strut connections to A-frame. Boom feet wide spread — no sway braces or cables. No boom jacking.

TYPE OF HOIST — Twin dual, single-part ropes, one attached to each side of dipper. Power automatically concentrated where needed on dipper lip to break through bank obstructions. No dipper bail.

SADDLE BLOCK — Cylindrical. Rubber cushioned against impact during fast plugging of swing. No binding with flexed dipper handles.

HANDLE — Single, tubular, one-piece, can rotate in saddle block. No handle twist possible.

CROWD MACHINERY — Located on revolving frame, close to center of rotation. Position reduces swing inertia. Accessible, protected.

TYPE OF CROWD — Quiet, positive, independent twin rope crowd and retract. Adapts itself to tubular handle rotation — low friction — less crowd power required.

CONVERTIBILITY — Shovels fully convertible to draglines of the independent motor type — no operating clutches or brakes.

There are many more reasons why these modern Bucyrus-Eries are the finest quarry and mine excavators ever built. Get the full story today. 43152C

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New Sinclair Grease for Heavy Duty Equipment

Tests prove New Grease Gives better Lubrication... Longer Life to Bearings

A new Sinclair grease with superior lubricating qualities for bearings of heavy duty equipment is now available. Sinclair HEAVY DUTY BEARING GREASE is specially compounded to *stay put* in heavily loaded, slow speed rotating or sliding bearings.

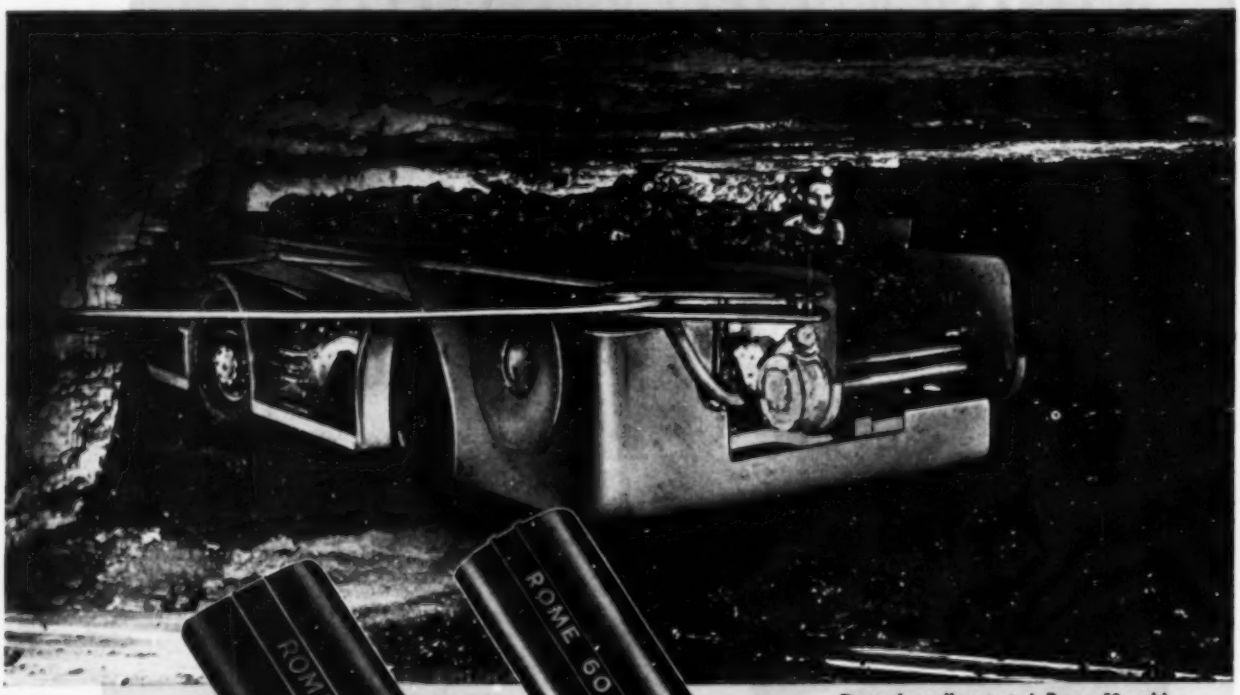
New Sinclair HEAVY DUTY BEARING GREASE has an exceptionally high load-carrying capacity... greater resistance to pounding and shock loads... greater resistance to melting out. Operators of power shovels, draglines, tipples, conveyors and all other heavy duty equipment are assured of longer bearing life... higher productivity... lower operating costs.

Sinclair HEAVY DUTY BEARING GREASE is available in three grades – "0," "1," and "2." It is easily applied with a hand gun or air gun. It comes in 35 pound pails and 100 and 400 pound drums.

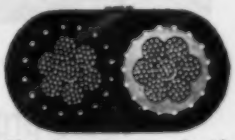
A Sinclair Lubrication Engineer can give you expert counsel on how you can get the most out of Sinclair's new HEAVY DUTY BEARING GREASE. Phone your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR HEAVY DUTY BEARING GREASE

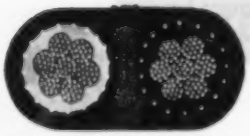
Give Rome 60 the *Rough*



Rugged, well-protected Rome 60 cables stand up—even under tough conditions encountered in low seams, rooms and entries.



Note how the open braid around each conductor firmly interlocks conductors to the sheath . . . prevents twisting, loosening and pulling.



The grounding conductor is solidly embedded in a Neoprene "web" giving exceptional protection against "shorts" and mechanical injury, yet maintaining flexibility and minimizing conductor distortion and fatigue.

Cable Jobs !

Conductors "geared" to Neoprene sheath—prevents failure from twisting, bending or pulling . . .

As the fall is loaded and moved out, you can't stop to worry about cables being twisted, pulled or crushed. *And with Rome 60 Mining Cables you don't need to.*

A strong reinforcing braid interlocks . . . actually "gears" individual conductors to the Neoprene sheath, providing 360 degrees of balanced adhesion, preventing failure from twisting, bending or pulling of conductors within the sheath. And this open braid construction permits maintenance of full sheath thickness with no thin spots.

A tough, resilient Neoprene webbing between the power and grounding conductors assures maximum flexibility, great resistance to impact and sure protection against short circuits . . . no fibrous separators to rot, deteriorate or wick moisture.

Corrosion, Abrasion, Flame Resistant

Molded in lead to a tire-like toughness, the Neoprene sheath is highly resistant to acids, alkalies, oils, abrasions, moisture and flame. The specially compounded, heat-resistant rubber insulation is suitable for operation at 75° C., providing for maximum overload protection.

To assure less "down time," higher tonnages and lower production costs, standardize on dependable Rome 60 Mining Cables—designed for long, tough service. P-105 BM molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes.

Rome 60 Drill Cord

- Neoprene Sheathed
- Long Service Life

Specially made for rugged mine service, these cords last longer and keep replacement costs at a minimum.

The all-resistant Neoprene sheath assures utmost protection against mechanical abuse. Maximum flexibility results from precise stranding of fine wires. The heat-resistant, specially compounded rubber insulation gives high electrical stability. Longitudinal fillers provide increased protection against crushing and tensional strain.

Manufactured in full conformity to State of Pennsylvania and Bureau of Mines Safety Codes, Rome 60 Drill Cord is marked P-105 BM.

The Rome 60 Line Includes:

- Type SO Portable Cords
- Single Conductor Locomotive Cables
- Concentric Mining Machine Cables
- Twin (Parallel Duplex) Mining Machine Cables —Types W and G
- Multiple Conductor Portable Power Cables— Types W and G
- Shot Firing Cord
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It Costs Less To Buy the Best

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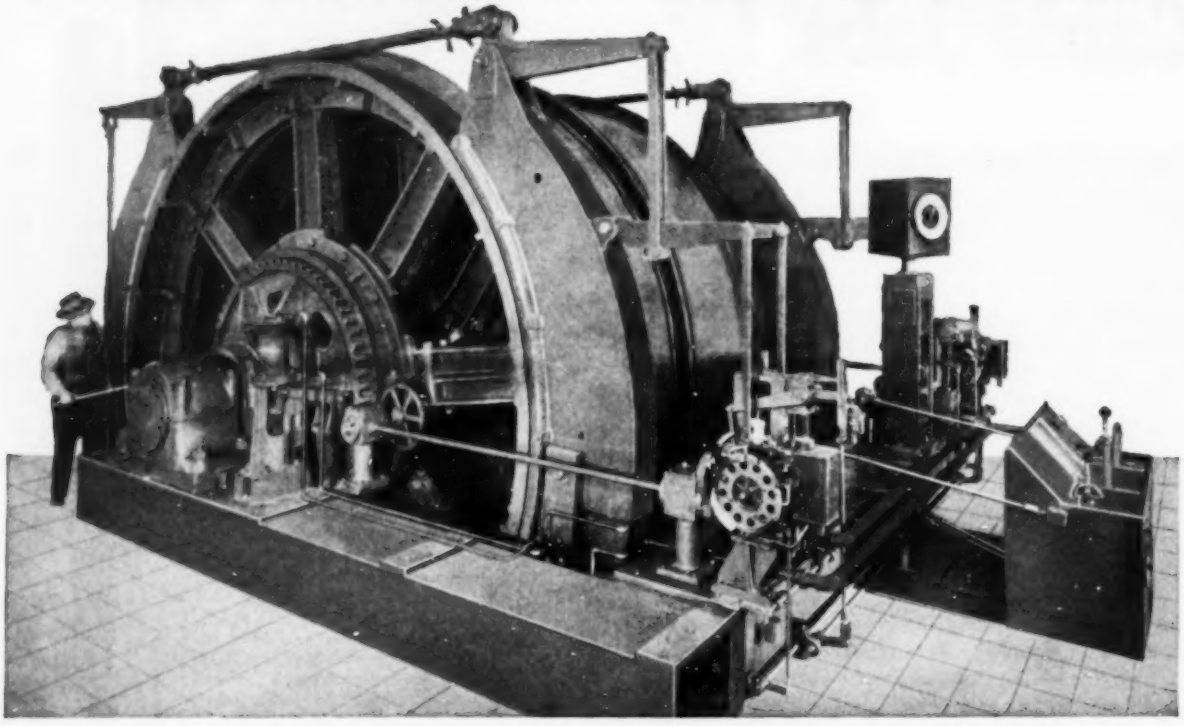
ROME CABLE ROME, N.Y.

ELECTRIC MINE HOISTS FROM VULCAN OF WILKES-BARRE



ARE DESIGNED AND BUILT TO MEET ANY SPECIFIED REQUIREMENTS

The Electric hoist shown above has "everything" to promote fast, safe, economical operation. Weighing approximately 420,000 lbs. it will be driven by two 1250 hp. A.C. motors through single-reduction herring-bone gears which are completely enclosed in an oil-tight steel casing.

The two "Built-Up" all-steel drums, 18 ft. in diameter and 4 ft. 3 in. in width, will each carry approximately 2500 ft. of 1¾ in. rope in two layers. One drum is equipped with a positive toothed-type clutch, for balanced hoisting from any one of three levels in a shaft 2625 feet deep. Each drum is equipped with powerful post-type parallel-motion brakes operated by oil-hydraulic brake engines and controlled by modern safety devices which provide dependable protection against any damage that might otherwise be caused by current failure or by errors on the part of the operator. Brake and clutch on the loose drum are mechanically and electrically interlocked.

The main shaft and both of the two pinion shafts are mounted on self-aligning spherical roller bearings. Other modern features include gear-driven micrometer depth indicators, a trip recorder, a recording tachometer and centralized control at a steel desk.

All VULCAN hoists are engineered carefully and built accurately. Many different types and sizes, from 5 hp. up, are illustrated and described in Bulletin A-407. Write for a free copy and tell us about your hoisting requirements. Our engineers welcome opportunities to make helpful suggestions without charge or obligation.

Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

New York City Office, 50 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, "ALLCASTSTEEL" SHEAVES, CAGES, SKIPS, GUNBOATS, ETC., UNDERGROUND CONVEYORS AND ALL TYPES OF LOCOMOTIVES FOR BOTH UNDERGROUND AND SURFACE HAULAGE

NOW BETTER THAN EVER!

the new, improved COALMASTER drill bits

Sizes:
1046.....1⅞"
1047.....2¼"
1048.....2½"

1 FORGED CUTTING BLADES
Greater tensile strength—for longer wear, fast cutting action.

2 REINFORCED PRONGS
More material where it is needed most. Minimum breakage, longer life.

Already famous for their fast-cutting, long-lasting performance at the blast hole, the Coalmaster 1046, 1047 and 1048 Drill Bits now offer you even greater value in these important new labor and material saving features . . . Plus, of course, all the other features that have already made Coalmaster Bits the favorites in so many mines: (1) Special-Analysis Heat Treated Steel, (2) Quick Replacement, (3) Scientific 2-Prong Spiral Design.

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Designed for the 365 Coalmaster Drill Head. Shanks adaptable to *all* auger types —or can be welded to any auger.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

ST. LOUIS 15, MO.

YOU'LL FIND THE LOWEST PRODUCTION COST PER TON WHERE COAL MINING AND COAL PREPARATION OPERATE INDEPENDENTLY

S-D "Automatics" moving over Surge Bin in one continuous, smooth operation, opening and closing doors automatically.

The "Automatic" Drop Bottom car is the only practical method of completely filling a Surge Bin to track level.

You only have to look around a bit to find the answer to rock bottom production costs of coal. The facts are wrapped up in those mines where mining at the face and the preparation plant can function independently of each other.

The S-D Automatic system of coal transportation from mine to cleaning plant is your guarantee of a continuous, even flow of coal, so necessary to low production costs. This includes an adequate Surge Bin which will serve as a temporary storage of coal in transit . . . the production balancing point between mine and preparation. This Surge Bin plus S-D "Automatic" Bottom Dumping Cars is essential to the low cost, independent working of mine operation and preparation plant.

Any cleaning plant works best, and at the least cost, with an even continuous supply of coal. The Surge Bin continues to supply coal to the preparation plant when, for any cause, there is a delay at the face.

With an adequate surge bin, one shift operation of cleaning plant is often sufficient to take care of two shift operation of mine. Breakdowns or delays at the preparation plant need not stop mine production because the surge bin will take the coal until repairs are made.

SANFORD-DAY IRON WORKS

KNOXVILLE TENNESSEE

Devoting Our Entire Capacity to the Building of Better Mine Cars for Over— 50 YEARS

Send inquiries to either Köln, Germany or Ulm, Germany

"Attach the detonating cap properly . . . Primacord will do its job safely, effectively

"This is the last job before the blast. Holes are loaded with a branch line in each one. You've laid your trunk line and connected your branch lines at right angles to it. Men and machines have been removed. You've checked and double-checked – everything's ready.

"*Now* attach the detonating cap to the Primacord. Up to this point, your blast – hooked up with Primacord – cannot be set off by sparks, friction, ordinary shock or stray electric currents. Primacord *must* be detonated with a blasting cap attached to one end of the trunk line.

"Place the cap and fuse alongside the end of the Primacord trunk line and bind together lightly but firmly with friction tape. Don't tie them together with string or wire – don't lay them under a rock! Place the cap gently on the ground and lay out your length of safety fuse*.

"Remember – in blasting, safety is a sign of skill. Be careful, all-ways."

Ask your explosives supplier, or write for further facts to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Also Safety Fuse since 1836

*Primacord can also be detonated with an electric blasting cap.

1. Cut the Safety Fuse squarely across with a clean, sharp knife to expose the powder core. Be sure you cut the fuse long enough, because a little more fuse is a lot more safety.

2. Seat this freshly cut end lightly but firmly against the charge in the blasting cap, and crimp cap onto fuse with a crimping tool.

3. Lay the Safety Fuse and its cap alongside the end of the Primacord trunk line, and bind lightly but firmly together, using friction tape. Place the cap gently on the ground and lay out your length of Safety Fuse.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1953

IVAN A. GIVEN, EDITOR

Really Worthwhile

A LOW PRICE still is and will remain one of coal's most powerful competitive weapons. A low price—and at the same time a fair profit—in turn requires a low cost. The roads to low cost are many—equipment, methods and managerial approach. It is a job for everyone, which naturally leads to the statement that two or more heads are better than one in this as in many other endeavors. In other words, meetings between supervisors and managers, set up for that specific purpose, can put pressure behind cost reduction, give direction to cost-cutting efforts, and bring out practical suggestions for getting results.

The bosses' get-together is nothing new in coal mining and it can easily be modified to provide emphasis on cost reduction. Perhaps two or three such get-togethers might be in order—say one for top management and one for mine management, with joint sessions at appropriate intervals. To achieve the most in results, certain principles should be observed: the theme should be cost cutting, the meetings should be held at regular intervals, and means should be provided for following up on suggestions and on recommendations that are adopted.

What can such conferences or meetings achieve? First, they get everybody thinking about cost and ways and means of getting it down. Second, they provide a means of channeling effort to the job. Third, they bring out suggestions for doing jobs better and cheaper. The regular cost-cutting conference not only can get results—it can get results that are really worthwhile.

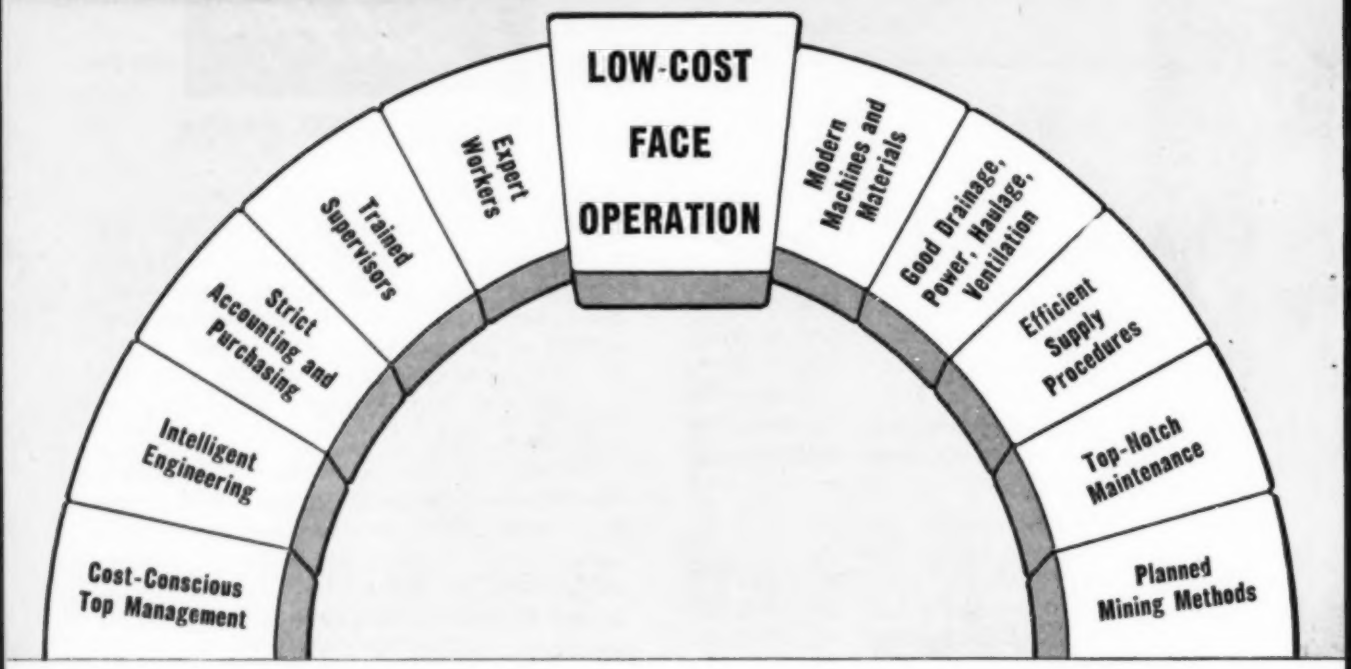
Still Coal

WHEN will coal, oil, gas, uranium and thorium be gone, forcing people to rely more directly—if not completely so—on the sun for heat and power? Some conclusions have come out of a three-day conference on solar energy last month at Madison, Wis., under the sponsorship of the National Science Foundation and the University of Wisconsin. By 2023, according to an analysis prepared for the Atomic Energy Commission, usable supplies of coal, oil and gas—meaning supplies at no more than twice present cost—will be gone. In another 175 years, uranium and thorium will be used up, making the deadline for solar power 2198.

Probably not even its makers would say that the timetable is as precise as this, but the basis for the estimates is a continued increase in population and use of power per individual, continually swelling the demand for fuels and energy. In the United States alone, the population is growing at the rate of 2½ million people per year, while each individual is using more and more power and energy. Significantly, coal is being cited more and more in all circles as the energy mainstay of the future. This may not mean more business in 1953, and perhaps not in 1954, but many influential people are telling coal's story and the number is growing. It can't be too long before it begins to have a real effect.

Oil Too

COAL has had to cope with excess producing capacity—with all its attendant headaches—for many, many years. Now it is going to have some competitive company — none other than the oil industry—and may as a result find itself benefiting from some easing of the pressure. This arises from the fact that gasoline capacity is now well ahead of demand and will require, in all probability, some restriction in output. And if the restriction goes far enough, the refineries, even though there is some leeway, must cut down on other products. Also, if the pressure softens gasoline prices, the tendency could well be to firm up the prices of other products, notably fuel oil. So, while oil may cut prices to move stocks of fuel oil now on hand, excess refining capacity might well bring about a reduction in fuel-oil supplies and a stiffening of prices. So overcapacity may work to coal's advantage for a change.



Smooth face operation—getting the coal down, loading it and moving it to the main line—provides a solid keystone for the arch of low cost which is built on sincere management, trained personnel, a well-designed physical plant and effective auxiliary services. How to cut and place this keystone is the theme of this special *Coal Age* report on . . .

Cost Cutting at the Face

GRANTING THE EXISTENCE OF AN EARNEST DESIRE to cut face costs, the first job becomes one of organization. The program must start in the president's office. That's where the drive for lower costs must originate. The natural follow-up is the application of the special talents of the accounting, purchasing, engineering and operating departments in determining what can be done, what will be done and how to go about it, step by step.

The resulting program, fashioned and backed up by top management, will be framed in full recognition of the natural conditions prevailing in the field or mine to be worked. That's basic.

The program will define the system of mining and the types of equipment to be used. It will recognize the fact that increased mechanization shifts the responsibility for high production one or more notches away from the operating department toward the maintenance department, and it will bulwark the maintenance department accordingly. It will include selection and training of face supervisors who, after all, determine the fate of the program through their ability and enthusiasm. It will contain provisions that will

How Mines Cut Face Cost . . .

CONTINUOUS MINING UPS TONS PER MAN

Making the big switch by installing six continuous mining machines over a period of 2 yr, one company raised tons per man-shift from 5.09 at the beginning of the conversion period to 8.65 at the end for all men on the payroll, including the manager. Injury costs were reduced from 11c per ton to 1.8c per ton in the same period, and explosives costs from 7.3c per ton to 4.7c with six miners and five conventional units operating (CA—June, 1952, p 76).

EQUIPMENT CHANGED FOR BETTER CYCLE BALANCE

A change from two-wheel-steer 3½-ton shuttle cars to four-wheel-steer 4½-ton units led to an increase in productivity of from 17 tons per man-shift before the change to 24.7 tons per man-shift after the change, total payroll included. Tapping more of the reserve capacity of the loading machine was the goal. This improvement, under less-than-ideal conditions, was assisted by a change to roof bolting to hold drawslate and emphasis on providing effective face voltage, and new mine cars to match shuttle-car capacity (CA—March, 1953, p 88).

OPERATIONS COMBINED FOR LOW-COST PREPARATION

Equipped with a hydraulic drill driven by the hydraulic system of a rubber-tired universal cutting machine, the two-man crew of the cutting machine makes top, bottom and shear cuts and drills four 2¼-in holes 9 ft. deep in each place in preparation for shooting. Safe, low-cost face preparation with the least number of men is the result (CA—August, 1953, p 94).

TIME-STUDIES FIND PRODUCTION KINKS

Sold on the value of proceeding on facts, this company secured data on all phases of operation, took the necessary steps indicated in the results of their study and came up with 20 cost-cutting changes in equipment and methods, with other such improvements to follow. Improved face preparation, better roof support, streamlined maintenance and supply-handling and improved haulage led directly to higher productivity, hence lower costs. (CA—May, 1953, p 92).

EQUIPMENT REDESIGNED TO INCREASE PRODUCTIVITY

Company-developed three-section face conveyor, designed for faster move-ups with minimum resetting of roof supports, increases loading time to 42% of shift time and raises productivity under adverse conditions to 15 tons per faceworker in wide-face work in 24- to 46-in coal (CA—October, 1952, p 76).

OUTSIDE LABOR USED TO SPEED UNDERGROUND JOBS

Roof bolts delivered to the face with expansion shells already attached and the use of keyhole bearing plates for easy insertion over the bolt heads reduce actual bolting time by eliminating bolt assembly at the face. Better protection for bolt threads and easier handling of bundles of bolts increase the efficiency of bolting right up to within 2 ft of the face (CA—October, 1953, p 74).

CIRCUITS SECTIONALIZED FOR BETTER, SAFER POWER

Adequate protection for both men and machines in the form of sectionalizing circuit breakers also means steadier power at effective voltage levels for better performance from machines, less interference among working sections when one section suffers an electrical outage and improved day-to-day productivity (CA—May, 1953, p 100).

ALUMINUM CONVEYOR PROVIDES LONGER ADVANCE

Aluminum trough sections, carried in aluminum frames, result in lightweight conveyor lines for longer reach per setup, eliminating extra drive units, permitting one loading point to serve more working faces and faster disassembly. Resistance to corrosion and reduced trough damage are further cost benefits (CA—July, 1953, p 78).

CARS LOADED WITHOUT ATTENDANT

Automatic loading controls, consisting of two coal "floats" attached to control switches, permit continuous loading of 25-ton cars without stopping the feed belt. Fewer delays in transportation, increased reliability, lower labor costs and reduced maintenance on belt drives and controls are the worthwhile advantages. Though used at an outside loading point, the same principle might well be used underground (CA—August, 1953, p 99).

TRACKLAYING SHUTTLE CAR BEATS SOFT BOTTOM

A continuous miner, a pick-up loading machine and a tracklaying shuttle car are effectively recovering pillars in the Pittsburgh seam where conditions would make other methods too costly and troublesome. Reduced haulway maintenance and elimination of roof shock from shooting add to overall efficiency (CA—July, 1953, p 98).

TIMBERING SPEEDED BY HAND-HYDRAULIC SETTER

Equipping gangway timbering crew with a hand-powered hydraulic timber setter materially reduced the time required to place heavy collars, eliminated the need for calling extra men from other jobs when a heavy timber had to be lifted and took the hardest labor out of the job (CA—May, 1953, p 106).

DRILLING FAVORS HIGH-CAPACITY LOADER

Two cutters with a universal machine center-shear the face, two drillers with post-mounted drills place four air-breaker holes on each side of the shear. Including the "shooter," these five face-preparation men are necessary for proper cycle balance to keep ahead of a high-capacity tractor-tread loading machine and two shuttle cars. As few as 13 men using high-capacity machines prepare and load out as many as 24 cuts per shift for a total of from 600 to 650 tons per unit shift. The peak for this large-crew operation is 700 tons (CA—May, 1950, p 70).

INDICATOR KEEPS MINER IN COAL

How to keep the cutting head of a continuous miner out of the roof and bottom was the problem until a mine mechanic designed an indicator to show where the head was cutting. Cleaner coal and longer bit life naturally followed (CA—December, 1952, p 93).

HIGH-CAPACITY MACHINES, operated as close as possible to rated capacity, mean low labor costs—the first step to low face cost (CA—May, 1950, p 70).

SHARP BITS in the proper pattern on the longest possible bar lead to high-capacity cutting when backed up by adequate power at the machine terminals.

Take Advantage of High-Capacity Units

CYCLE BALANCE depends upon matched production and haulage units, at the face and on the main line. Balance also means low cost (CA—July, 1953, p 98).

insure adequate power at the face, maximum safety, effective ventilation, good drainage and smooth supply-handling—all with the goal of keeping the nose of the loading device growling in a pile of well-prepared coal, and with the added aim of smoothly moving the coal out after it has been picked up and loaded.

In general terms, that is the essence of cost-cutting, but are there more explicit guides? The answer is "Yes." The record is full of examples of how higher efficiency, hence lower costs, has been achieved at the face through the application of better methods, improved equipment and new materials.

What can be done? How can the fat be cut out of operations at the face and back to the main line? What is the first step?

Take a Good Look

Close examination of the present set-up followed by sober thought is the first order of business. This means getting time-study data on paper, then analyzing these facts and taking the steps the analysis indicates.

Taking a good look may mean stifling the urge to rush at the loading operation with stopwatch in hand. Loading delays often are the result of delays and sloppiness in other elements of the cycle. Hence, that is the place to start.

The proper approach, then, is to isolate for individual study each of the elements in the cycle. Working the bugs of high cost and unnecessary delays out of each of the elements will bring the cost-cutting effort up to the loading operation with a better chance of increasing loading-time per shift.

Having eliminated unnecessary delays from the cycle, insofar as possible, the cost-cutting effort may be turned to an investigation of so-called necessary delays, with an eye to eliminating even some of these. It was through methods like these that production engineers finally removed "necessary" delays to loading, such as, cutting, drilling and shooting, and brought about continuous mining, as we know it, as the end result.

Extending the thought, continuous mining also has its necessary delays. After getting the facts on paper, one company noted that roof support consumed 15% of available working time, a necessary delay if ever there was one. But further study showed that roof bolts, installed by combination roof drills and wrenches attached to the sides of the mining machine, could be set and tightened while the ma-

chine chewed at the face. A respectable gain in working time for the machine was the immediate result, tons per man increased and costs slid off in proportion.

Cost improvements which can be made where machine loading is the practice also can be made where continuous mining, conveyor mining or other methods are employed, since these other methods also are more or less cyclic.

High-Capacity Equipment For Favorable Costs

High-capacity machines, operating on a smooth cycle and manned for highest possible tonnage are the keys to cashing in on the fundamental goal in turning to mechanized mining. Unfavorable natural conditions, however, may force operators in some instances to expect less tonnage and to compensate for this with smaller crews. But where conditions permit, logic dictates keeping machines working at maximum capacity as much of the time as possible, thus reaping highest returns for the necessary investment in machinery and in high-cost manhours.

The application of high-capacity machines presupposes that mining methods also will be designed for high production. A sufficient number of working places and streamlined services all the way back must be provided if the installed higher capacity is to mean anything.

Higher capacity applies not only to the loading operation. Limited cutting capacity, to take one possibility, may be a brake on the whole operation. If your study of the elements of face preparation show too many instances of "waiting for the cutting machine," you have several ways to turn.

- **Add another cutting machine** which may divide its time between two units to bring cutting back into tune with the cycle. But this is a last resort because it will complicate the schedule and increase the size of the crew.
- **Replace the present machine** with a new one of higher capacity. But don't be too hasty. You can justify such an investment only after you have exhausted this next possibility.
- **Work over the present machine** to see what can be done to increase its capacity.

Coal-cutting speed is the important measure of a cutting machine's capacity. Top speed demands rated voltage at the commutator, a straight bar, an unviolated lacing pattern prescribed by the coal being cut, sharp bits and expert operation. If face voltage is down, give up on the face equipment—the solution to the problem lies everywhere.

A straight and true cutterbar, though, will help to eliminate chain breakage, thereby reducing mechanical delays, increasing available cutting time, and raising cutter capacity accordingly. The lacing pattern can be preserved by immediately replacing broken or lost bits and by replacing broken links with exact duplicates.

Bits are a fertile field for investigation into possible higher capacity. New developments in this field are tumbling over each other, including improved alloy-steel and tungsten-carbide types in different grades for different cutting problems; new bit designs featuring beefed-up bodies to provide more backing for the inserts, and better brazing materials to hold the inserts in place. Experimentation may be well worth the time and effort involved if you can practically eliminate bit-changing time, reduce cutting time by as much as 40% and cut bit-cost per ton to a fraction of a cent, as many operators have done. As an added bonus, sharp bits reduce cutting-power requirements and reduce wear and tear on the cutting-machine parts.

These are examples of how the first steps toward increasing capacity can be taken. The ultimate goal is to keep all face-preparation machines and operations ahead of the loading operation, whether the loading is done by machine or by hand onto conveyors.

You can go still further. Conditions permitting, you might be able to widen working places, especially with planned roof-bolting as an aid. Or you may be able to go to longer cutterbars, which will increase tons per fall without excessively increasing actual cutting time, thus reducing machine moves or interruptions in the loading operation where conveyors are employed.

If drilling is the bottleneck, you have ample opportunities for raising drilling capacity by investigating the advances in drilling tools and techniques. These advances range all the way from better hand-held drills powered electrically, hydraulically or through flexible shafting, through post-mounted units with threadbar feed and on to mobile drills with multiple drill arms designed for power positioning and power feeding. Again, the goal is to achieve high-level drilling performance over the entire shift by making it possible for drillers to do more with less effort.

Furthermore, drill-bit technology is moving along as fast as cutting-bit improvement. Right now, one operator in the Alma and Thacker seams in Pike County, Kentucky, is drilling

Ten Hallmarks of a Low-Cost Face Cycle

1. All crew members are busy but not flustered.
2. The section shows good housekeeping—an indication that necessary service work is not neglected.
3. The foreman moves around with a purpose. He knows what goes on in each of his working places and he has a production goal for his unit shift.
4. Openings are driven straight and true, working-place width is consistently maintained and reasonably-smooth ribs are evidence of first-class workmanship.
5. Roof support follows a definite pattern.
6. The section mechanic is busy but relaxed. He's maintaining, not repairing under pressure.
7. The transportation system handles production as long as the loading operation is ready, willing and able to proceed.
8. Rock dust is close to the face, dust-control sprays are working effectively, safety posts are placed without orders.
9. Strict compliance with mine law and company rules is evident.
10. One or more mine-developed ideas are in use to increase efficiency or improve safety.

FAST, SAFE DRILLING, powered by the cutting machine or an independent drive, permits combined face operations (CA—Feb., 1953, p 94).

CONSERVING high-cost underground labor through the use of preassembled bolts and keyhole bearing plates keeps cost down (CA—Aug., 1953, p. 94).

Adopt the Best Tools for the Job

SENDING A LONG HOLE instead of men up steep pitches results in improved safety, increased recovery, higher output, lower costs (CA—Mar., 1953, p 76).

2-in holes in drawslate partings using hand-held electric drills and achieving a bit cost of 0.14c per ton. Tungsten-carbide bits make it possible.

Shooting may be the culprit. The shotfirer's presence in the cycle may never delay the loading operation, but tight coal might. Pinpoint investigation of both drilling patterns and coal-breaking media is necessary to get improved loadability. Coarse coal, stacked up at the face to reduce loader maneuvering and thus increase actual loading time, is a result of such study.

As a final measure, however, getting more coal for the same labor outlay may involve a switch to modern machines with higher built-in capacity. The higher capacity in the new machines should permit writing-off the remaining life of the older equipment, excluding its salvage value, while still realizing a dividend in lower costs.

A corollary benefit of higher-capacity units is the possibility of faster extraction which eliminates some of the headaches and costs of long-term roof maintenance. Such savings alone may be enough to justify a change.

Smoothing Out Kinks In The Face Cycle

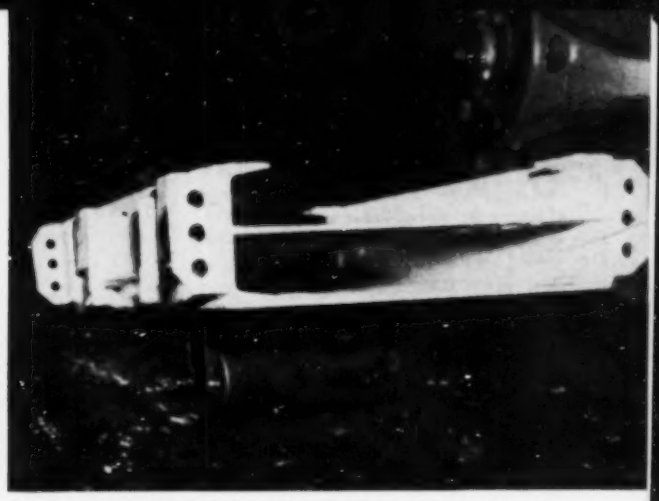
The use of face machines of matching capacity will provide a good start in setting up a balanced operating cycle, but for lowest-possible costs other factors also must be taken into account if the balance is to be maintained hour-by-hour, shift after shift.

Conditions may permit modifications of traditional methods. For example, a change to roof-bolting will provide wider clearances to permit faster, safer movement of the high-capacity equipment.

Where steep pitches are a problem, long-hole drilling may permit keeping the men out of the coal and bring about increased productivity, higher recovery and greater safety. Slant-chute methods, which reduce the manual labor and time required to haul supplies up steep places may be your answer to lower costs. Where moderate pitch prevails, rooms along the strike with shuttle-car or conveyor transportation to downpitch gathering units have shown to good advantage. In any event, low-cost pitch mining is achieved by taking all possible advantage of gravity flow without sending men up steep pitches to promote this flow.

In conveyor mining it may be possible to widen places and increase loading time through the use of a

EFFECTIVE PLANS for developing 48-in coal leads to daily output of 15 tons per man (CA—Aug., 1953, p 80).



MINE-DEVELOPED FACE CONVEYOR for wide faces increases loading time to 42% of shift (CA—Oct., 1952, p 76).

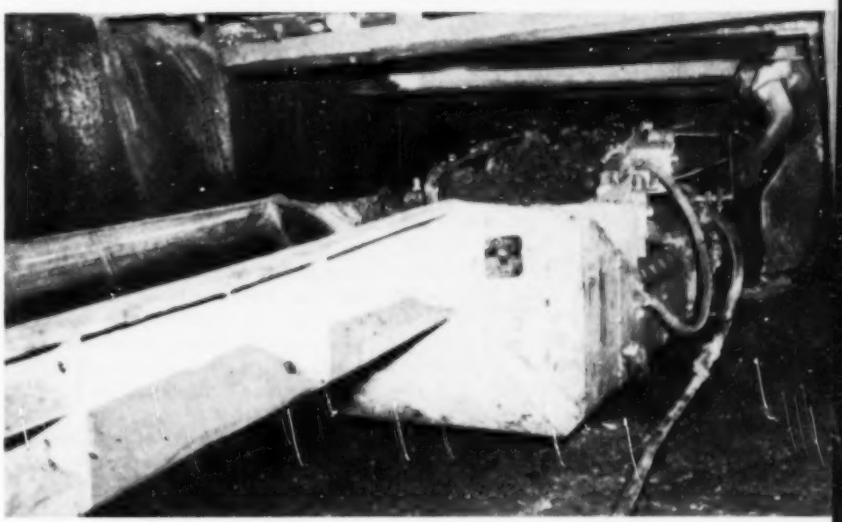
Better Face Haulage Means Stepped-up Loading

specially-designed face conveyor and the adoption of a streamlined operating cycle, as one Virginia operator did (*Coal Age*, October, 1952, p 76). His modifications permit faster moveups of the face conveyor with minimum resetting of roof supports and the result is increased loading time.

Longwalling, too, is coming to the fore in permitting recovery of areas not economically minable by other methods. Getting a good start at the beginning of the shift is another aid to higher productivity. It's difficult to salvage respectable tonnage from a shift that starts off poorly. Getting off to a running start, though, depends upon effective supervision, both in operation and maintenance. Production supervisors must try for a standard leave at the end of their own shift to give the next crew a reasonable chance to load coal. Maintenance supervisors, of course, must organize their departments to clear mechanical outages as quickly as possible. One section out of synchronism can jog the smooth operations of an entire mine.

But neither the production supervisor nor the master mechanic can insure this performance without the active support of top management. They'll need, among other things, adequate supervisory training and a constant flow of information to convince them they are not flying blind. If there is a cost goal, and there should be, the supervisors should know what it is. They should also be informed at all times as to the progress they are making in reaching the goal. This may sound trite, but it's true.

Coming down to brass tacks, maintaining smoothness in the cycle is the responsibility of mine management—not top management. It requires a knack of expending supervisory effort where it will do the most good, and that usually means in the face-preparation activities. Keeping everything ahead of loading is the object.



BETTER LINK between loading machine and room conveyor leads to full use of machine capacity (CA—Sept., 1953, p 100).

Making a continuous estimate of the situation is a useful supervisory device for maintaining balance in the cycle. Every off-beat action of every face machine will generate a reaction in some other unit. The supervisor must look ahead to foresee these reactions and to take steps to handle them in such a manner that they will not upset the cycle. Changes in natural conditions or substandard performance in any of the face-preparation elements, for example, must be detected rapidly and compensated for. Alert supervision like this leads to lowest-possible face costs.

Manpower For Low-Cost Face Operations

How many men for the job? The diversity in conditions from mine to mine militates against setting up hard-and-fast numbers, but in a few words, there should be enough men in a machine-mining crew to keep the cycle in balance—and no more. Whether natural conditions limit the face work to small crews or permit the employment of large crews, the economical investment of man-hours is a must if lowest-possible costs are to be realized.

How can manpower requirements be tightened up? What are some of the possibilities?

Conserving manpower is an exer-

cise in adopting new materials and new machine developments. That's one approach. It also includes making changes in operating methods where study shows the work can be done with fewer men under the new methods. Here are examples.

Cycle elements may be combined—As an example, the flexible-shaft or hydraulic drill, designed for operation from power take-offs at the cutting machine, provide an opportunity for combining the cutting and drilling operations. The benefits are further increased if the cutting machine is equipped with a bugduster. Now two men, who formerly spent their time in sporadic cutting, in laborious kerf-cleaning with a long-handled shovel, and in moving safety jacks or posts can use their time to better advantage. While one man operates the machine, the other moves the safety supports until the last one has been cleared. Then he prepares the drill and both drill the round when the cut is completed. More of their available man-hours have been spent in gainful face preparation.

Discharge stations for shuttle cars may be streamlined—In track mining, automatic car spotters or robot locomotives may be set up for push-button control by the shuttle-car operator. Where belt haulage is used from the room-neck outward, surge conveyors and high-capacity elevators will permit faster shuttle-car discharge, thus shorter trip time. The goal is to increase the time the shuttle car travels with a load, and to combine this gain in useful employment with the labor savings realized at the automatic discharge station.

PREFABRICATED SECTIONS permit fast installation of reclaimable stoppings. Similar equipment is being developed for overcasts (CA—Sept., 1953, p 118).

Modern Materials Provide

Service labor may be reduced—As a case in point, roof bolts may serve the auxiliary function of providing anchorage for adapters which will support brattice lines, feeders, water lines or other utilities. It's killing two birds with one stone, so to speak, and that's one way of getting the most out of every necessary job performed in the mine. Fewer servicemen or greater output per serviceman is the result.

Certain face practices may be modified to reduce maintenance—One company has designed special hangers which may be inserted into the angle washers on the rib row of roof bolts. Standard procedure is for the helper to hang the trailing cable and water line from the continuous miner and the trailing cable of the pick-up loader in these hangers as the work advances. Short pipe nipples slipped over the steel rod from which the hangers are made permit the cables and water line to be pulled through the hangers without undue friction, since the nipples roll under the moving cables and hose. Fewer cable failures and conserved maintenance labor and supplies are the results.

More effective manpower for modern mining also may be secured by providing opportunities for men to upgrade their own quality as mine work-

ALUMINUM SHAKING-CONVEYOR permits longer advance from each setup (CA—July, 1953, p 78).

WELL-DESIGNED POWER SYSTEM keeps production rolling by isolating faults (CA—May, 1953, p 100).

STEEL TUNNEL LINING, used as reclaimable overcast, can be erected and sealed by two men in less time than masonry job (CA—Jan., 1953, p 84).

Services With Less Labor

ers. That means training, which may be organized within the company or purchased or accepted from an outside agency. How much can you afford to invest in training?

Try a numerical example. Assume a mine producing 2,000 tpd at 20c per ton, net profit, suffers delays of 10% of working time as a result of electrical troubles in machines. The goal is to cut this down-time through faster trouble-shooting. How much can be invested in training for electricians to achieve this goal if the cost of the training is to be written off in only 100 working days? If the training is well planned, the goal will be achieved and production will increase 100 tpd. That is a $20 increase in daily net income. In 100 working days, a $2,000 training investment could be written off and the dividends would begin to accrue. That's a respectable appropriation for training, but it can be made to pay off quickly if the training dollar is spent as cannily as the equipment dollar.

For the sake of curiosity, substitute the production, net-profit and electrical-delay figures at your mine. Or you can figure on increased tons per man rather than more tons per day. Calculate how much you could afford to invest in training for a 50% reduction in electrical delays and a 100-working-day write-off of the investment. With savings like these in the offing, effective training in all phases of mining merits the interest of top management.

Still another way of getting the most out of each dollar spent for labor is to take steps to see that new types of machines get a fast start as soon as they are taken into the mine. Displaying them on the surface for a few days and permitting operators to become familiar with controls may lead to better early performance at the face.

LUBRICANT CONSUMPTION was cut 65% and bearing failures were materially reduced by this grease truck (CA—Feb., 1950, p 114).

Moving Coal Away From The Face Efficiently

As the production capacity of face equipment rises, either through the installation of larger units or modification of methods, the problem of moving the coal away from the face and into the main haulage system becomes more acute. The development of face transportation approaching a condition of continuous flow is becoming more and more important in modern low-cost mining.

If there is one place where overcapacity in equipment may be justified, it is in face haulage. Spending an extra few cents per ton here may result in savings twice that amount by permitting fuller realization of the untapped capacity in loading and continuous-mining machines. Therefore, planning for face transportation should aim at the primary goal of moving away every ton of coal as fast as it is produced, and not merely a goal of lowest-possible cost per ton-mile. There is a balance, however; the secondary goal cannot be entirely neglected without damaging over-all efficiency.

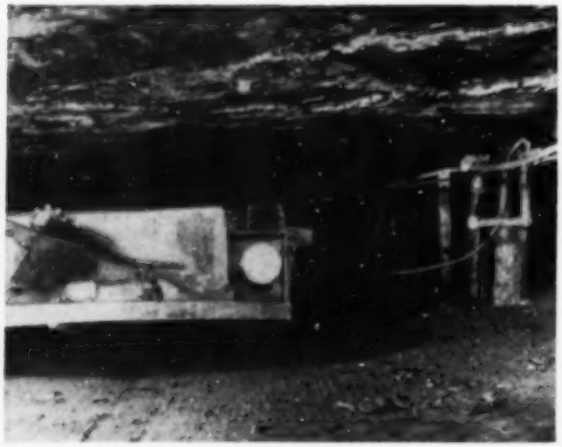
Synchronization is the key to better face transportation, regardless of the type of equipment used. In general, though, high-capacity units are preferred, either mine cars or shuttle cars, to reduce the time the loader need be stopped for a change. The natural follow-up is to take advantage of the increased capacity by keeping switches or passing points as close as possible to the loading point to limit changing time.

The role of conveyor transportation has been expanded by the development of the bridge unit, which provides a link designed to tie a loading machine to the room conveyor while eliminating excessive maneuvering of the loader. Furthermore, in some instances it may permit a change from hand loading to mechanized loading

1 **SPARE PARTS** in supply depots on the section reduce production losses resulting from mechanical outages.

2 **SHOCK ABSORBERS** at cable-connection points materially increase useful cable life (CA—Jan. 1953, p. 114).

Five Ways to Cut Maintenance Costs



3 **DOUBLE INVERTED TROLLEY** frees cable-reel car for flexible supply distribution (CA—July, 1953, p 88).

4 **PALLETIZED TIMBER-HANDLING** to serve timbering machine reduces labor cost 50% (CA—June, 1949, p 80).

5 **WATER-FILLED TIRES** on shuttle cars in some instances have lasted twice as long as air-filled tires (CA—July, 1953, p 110).

into conveyors, always a cost-cutting possibility.

A small shaft need not limit the search for higher capacity in face transportation. Large transfer cars at the face, like the track-mounted shuttle car, may discharge through a surge bin into smaller cars designed for the shaft.

New developments hold promise for realization of the continuous-flow principle. Shuttle belts, which can follow a continuous miner through an advance of 50 ft before a new section of belt must be added, have been tried and found effective. The tail assembly is carried on a self-propelled, tractor-tread chassis to stay under the discharge boom of the miner. Rope-haul shuttle belts for use on track or rubber also are available.

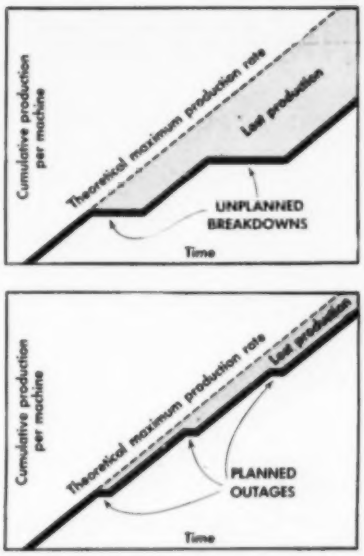
At one mine, where on-shift supply handling could interefere with belt haulage, the return side of the belt is

carried off to one side of the tail pulley, given a turn on specially-designed quarter-turn pulleys and bedded on a parallel conveyor. Supplies are carried in on the parallel belt while coal is transported on the main conveyor.

Cascade conveying across individual conveyor units in tandem, articulated conveyors for around-the-corner transportation and the pick-up loader all provide opportunities to increase the freedom of the continuous miner.

Faster conveying and longer reach per setup will increase the long-term efficiency of face transportation if drive units of high capacity are specified.

Given the units to do the best job under the existing conditions, the responsibility for smooth, synchronized face transportation lands in the laps of the mine supervisors and maintenance department. In view of the peak production rates of modern face units, a fair share of supervisory and maintenance effort must be invested in making sure the coal moves away.



PRODUCTIVE MAINTENANCE, based on planned outages for inspection and servicing, cuts over-all costs by regaining much of the production lost through breakdowns.

Serving the Face Crews And Equipment

Modern low-cost mining in essence is a materials-handling job, toward as well as away from the face. "Raw materials," such as ventilating air, roof-support supplies, rock dust, water and so on, must be channeled in to support coal production. Finally, process wastes, such as excess water, foul air and debris, must be disposed.

Each of these individual jobs must be closely studied to determine the most effective ways to get lowest costs with effective performance. Here is where new materials can be of great help. As pointed out in the third article in this series (*Coal Age*, July, 1953), new materials for the support of face production are made to last longer, thus reducing installation and replacement costs, and are designed for simple, fast installation, thus controlling labor costs. Included in the list are plastic pipe and sheeting, protective coatings, lighter and stronger alloys, long-life insulation, improved lubricants and so on.

New additions to the list include prefabricated metal panels for fast construction of stoppings (*Coal Age*, September, 1953, p. 118). The 1-ft-wide telescoping panels are installed side by side, clamped in place and caulked to make a leakproof stopping. They can be easily reclaimed. Aluminum shaking conveyors can be moved in less time. Neoprene-base coatings are available for spraying or painting on mine cars or in other applications.

A reasonable investment in power-distribution equipment and labor, designed to keep face voltage up to rating, will be paid off with interest through better machine performance, fewer electrical outages, lower maintenance costs and greater safety. Adequate substation capacity is the first requirement. The follow-up includes the installation of approved, efficient distribution centers, well-designed plugs and nips at every power connection and effective circuit-breaker and fuse protection.

With labor costs running 50% or more of the total production cost per ton, new equipment designed to conserve labor in handling the auxiliary services is about as important as high-capacity units at the face. High capacity at the face without the backing of streamlined services puts "too many eggs in one basket."

Coursing ventilating air through the workings offers other opportunities for savings. Where numerous overcasts are necessary, prefabricated materials may be employed. Preventing leakage through doors and stoppings will result in better face ventilation at lower power costs. The cost of constructing doors may be reduced by hanging the doors from roof jacks, and salvaged rubber belting can be used for building long-life curtains across haulageways.

Gravity drainage of course can't be touched for low costs. Seize every opportunity to achieve gravity flow, including flat boreholes through pillars or to the outside or perhaps boreholes to lower old workings which may open to the outside. Plastic and aluminum pipe will cut the cost of installing and moving drainage lines.

Palletized supplies are easier to handle; for example, bound stacks of cappieces and blocks for timbering and roof-bolting require less time to load and unload. Packaged roof bolts in one- or two-man loads speed the distribution of this item, if face transportation units can be pressed into service to carry them to the face.

There are cost benefits also in taking advantage of low-cost outside labor in doing certain jobs to free inside labor for more important work. Making up roof-bolt assemblies on the surface and buying ready-cut wedges are examples.

At several West Virginia mines, roof-bolt bearing plates with a "keyhole" slot are used. The large part of the keyhole may be passed over the nut then the small opening of the keyhole is moved over to fit around the bolt and to be retained by the nut. The bolts and plates are delivered in separate bundles, but again the major part of the bolt-assembly operation has been done on the outside. Furthermore, the expansion shields already are in place, affording protection for bolt threads.

Top-Notch Maintenance Means Low-Cost Production

Last, but not least, preventive maintenance of the highest caliber is the service contributing most to smooth operation and lowest costs. Scheduled lubrication, inspection at definite intervals and, if possible, planned outages of machines for overhauling will go a long way toward putting maintenance costs on a somewhat predictable basis. The obvious advantage is that fewer unnecesary delays occur when they can least be tolerated.

Replacement parts and unit assemblies, stored in section depots, will result in faster clearance of delays, but smooth supply-handling procedures will be necessary if this is to be done with a minimum of waste. Some system of perpetual inventory at the main supply room and an airtight system of requisitioning are musts.

Controlled Underground Gasification

A suggested system incorporating steam production and aimed at readily controlled production of high-quality gas

By LOUIS F. GERDETZ
Mining Engineer, Wheeling, W. Va.

WHAT ARE THE PROSPECTS for underground gasification of coal? Since coal has been and is being gasified in place, it is not a question of whether it can be done or not. The big problem is making the process commercially feasible. In this connection, perhaps the No. 1 question is the goal in gasification. There should be little hesitancy on that score. The aim should be a product that can compete directly with the products of petroleum and natural gas, thereby broadening markets for coal by making it available in a different form, at low cost, to those who desire a gaseous fuel or raw material. This is not to say that underground gasification would produce such a fuel directly. However, there is no reason for not aiming at a gas with a relatively high Btu at a cost low enough to permit further treatment by known methods to raise the heat content and make it readily competitive.

The gasification process thus becomes the key to success, since a good low-cost gas in large by readily controllable volume is essential. Steam is a readily available means of enhancing the quality of a producer-type gas. The gasification process therefore should incorporate steam production not only for use in the process itself but for other purposes for which steam commonly is used.

A suggested process incorporating steam production and evolved from several years of study of the underground gasification problem is shown in the accompanying illustration. This process, patent applied for, is designed to provide the following advantages:

1. Rapid transformation of large volumes of coal to the gaseous state.

2. Simultaneous generation of low-cost steam, at desirable pressures, for use in gasification, and for other purposes.

3. Production of a relatively high-Btu gas at a cost well below the cost by conventional producer processes carried on on the surface.

4. Preparation of the gasification site by conventional mining methods.

5. Opportunity for direct approach to the gasification area at all times, thus permitting direct supervision and control of operations.

6. Ready control of gasification rate and volume of product to eliminate costly storage facilities and handling losses in meeting possible seasonal fluctuations in demand.

PLANNING FOR GASIFICATION

Gasification under this proposed system would be based on preparing and burning the coal in panels on a retreat system, as shown in the illustration. Naturally, this panel plan can be modified to meet conditions. Development in coal would be done by conventional mechanized mining, including the use of augers to honeycomb the coal in the panel to create multiple burning zones and draw off the gas to a central gas conduit, as shown in the illustration.

The goal in development or first mining would be extraction of 20 to 25% of the solid coal, allocating the remainder to gasification. To facilitate control, pairs of panels would be surrounded by appropriate barrier pillars. Operation on the retreat in accordance with this plan permits fresh-air ventilation of the area outside the burning zone without return through the live workings. Instead, the air goes into the fire zone to make gas, which is drawn off through a separate exhaust system.

Separation of the fresh air and the exhaust system is accomplished by a rock tunnel, or central gas conduit, underneath the seam, with borehole or rock-chute connections to the panels above. This rock tunnel would lead to a gas exhaust shaft to the surface. As an alternative, a series of shafts or boreholes to the surface may be employed. The rock tunnel would be lined with a refractory sprayed sand-cement mixture if desirable. Where the coal seam outcropped, exhaust shafts or boreholes could be eliminated. Also, the main gas conduit or tunnel could be made in the coal, but the disadvantages outweigh the lower cost.

With this system of providing one-way flow of fresh air into the gasification zone, it is apparent that men can directly approach the gasification site for control purposes, and can work outby in preparing new gasification panels. Two supplementary return airways flanking the layout are connected to an independent return circuit, thus permitting continued ventilation of the area if gasification was temporarily slowed down or stopped. Also, means is provided for isolating the gasification areas at any time by short-circuiting the air into the rock tunnels by the boreholes outby the gas-producing panels.

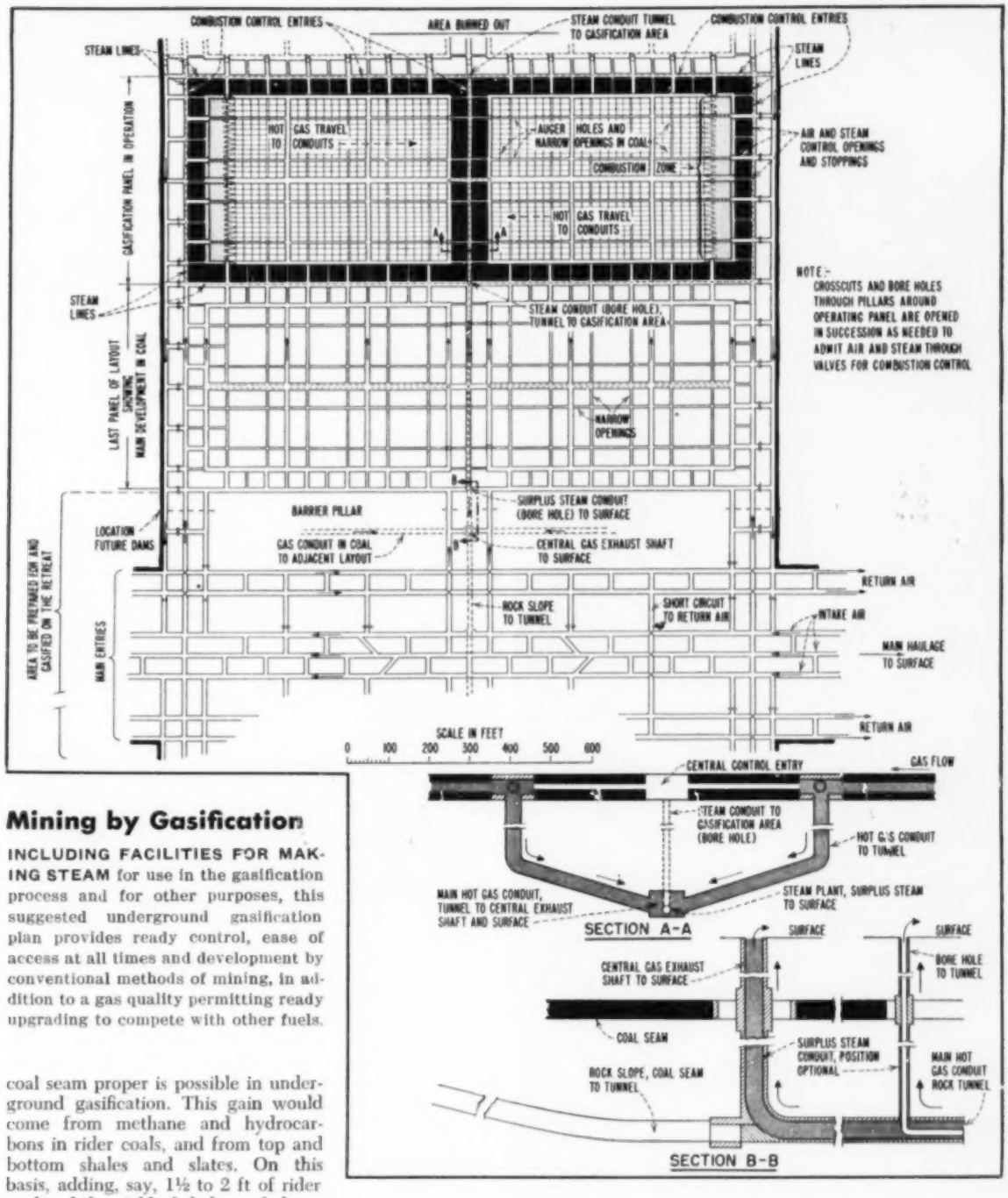
PROVIDING STEAM

To permit achieving the goal of steam generation for gasification and other purposes, the plan envisions one or more steel pipe lines of the required size and capacity to resist pressure laid in the main hot-gas conduit. Connections for cold-water feeding would be made at suitable points, and steam required in gasification would be transmitted to appropriate injection points by branch lines. Surplus steam would be taken to the surface for use there. The temperature of the hot gases in the main gas conduit should be sufficient to generate a large volume of steam at any desired pressure, within reason. The cost should be very low.

A panel such as that illustrated would contain approximately 120,000 tons, 5-ft coal, of which approximately 25% would be removed by conventional methods in "first mining." If the coal was Pittsburg seam, analyzing 55% fixed carbon, 35% volatile matter and 10% ash, etc., theoretical gasification yield per ton would be 110,441 cu ft at 241 Btu per cubic foot, including steam contribution, and the loss of energy would calculate out to 11%. Losses in even the best producers on the surface are that much, and with older types they are 25 to 40%. Their product averages 150 Btu. Also, of course, the underground panel could not be duplicated in capacity on the surface without a prohibitive cost.

GAINING ENERGY

Actually, however, it is my conviction that an actual gain in energy over that theoretically available from the



Mining by Gasification

INCLUDING FACILITIES FOR MAKING STEAM for use in the gasification process and for other purposes, this suggested underground gasification plan provides ready control, ease of access at all times and development by conventional methods of mining, in addition to a gas quality permitting ready upgrading to compete with other fuels.

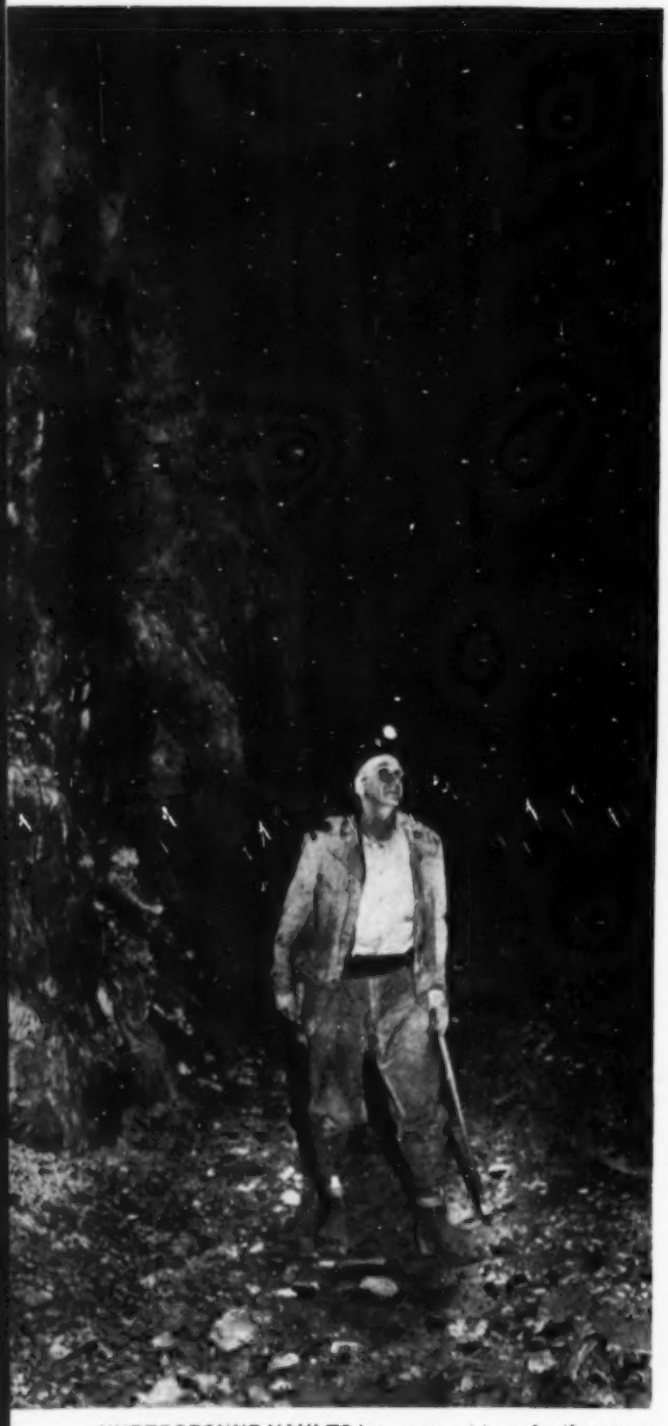
coal seam proper is possible in underground gasification. This gain would come from methane and hydrocarbons in rider coals, and from top and bottom shales and slates. On this basis, adding, say, 1½ to 2 ft of rider coal and the yield of shales and slates, theoretical yield per ton of coal, on the basis of a 5-ft seam, would be 136,500 cu ft of gas at 283 Btu per cubic foot. The gain in energy would calculate out to 44.9% in this instance. Naturally, the gain, if any, would vary with the conditions at each possible gasification site.

Cost calculations also must necessarily be theoretical at this time, but the total should not exceed $4.50 per ton of coal in place for the entire output, coal to the railroad car and gas to the collar of the shaft, excluding any further steps to raise the quality of the gas.

In the panel illustrated, approximately 400x1, 500 ft, containing 120,000 tons (5-ft coal), 75% gasified, and operated to mine and gasify 1,500 tons per day, estimated panel life would be 80 days. At 136,500 cu ft per ton, daily gas production would be 153,563,000 cu ft. Using the previous production cost of $4.50 per ton of coal and coal equivalent, and with a heat content of 283 Btu per cu ft, gas cost delivered to the surface would be 3.297c per 1,000 cu ft, and cost per million Btu would be 11.648c.

Union Pacific stresses safety at Hanna 4-A in . . .

Mining a 30-Ft Seam



UNDERGROUND VAULTS is a more apt term for the rooms at Hanna 4-A. The roof is up there, 29 ft from floor.

Three passes through rooms break down successive cuts in safe recovery of thick seam. Tractor-tread shuttle car passes muster on 18% pitch and in side-pitching rooms while running on fire-clay bottom.

STRIVING FOR HIGHEST POSSIBLE RECOVERY with maximum safety in mining a thick seam of Wyoming coal, Union Pacific Coal Co. removes room coal in three successive lifts using mechanical cutting and loading equipment and rubber-tired and tractor-tread shuttle cars, at Hanna 4A mine, Hanna, Wyo.

These Carbon-County operations of the company are in the Hanna No. 2 seam, which has an average pitch of 18% and varies in thickness from 20 to 32 ft, with thicker coal predominating. Persistent bone markings occur at about 7 ft and 19 ft above the bottom, thus dividing the seam into three benches. The coal is classified as subbituminous with a range analysis showing about 12% moisture, 40% volatile matter, 43% fixed carbon, 5% ash and a trace of sulfur. Heating value is about 11,000 Btu per pound, and ash-fusion temperature, about 2,400 F. In supervising the production of this fuel for the steam locomotives of the Union Pacific R. R., J. R. Reuter, mine superintendent, points out that one of his major responsibilities is constant inspection and maintenance of the high ribs to insure a safe working environment.

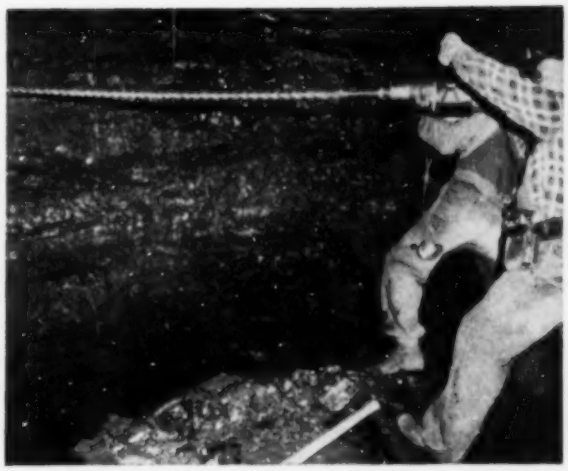
Assisting Mr. Reuter in this safety mission and in the job of producing 2,000 tpd are Ben Cook, mine foreman; Albert Gaskell, machine boss; Charles Ainsworth, master mechanic; W. J. Egan, resident engineer; and James Clegg, tipple foreman, who direct the efforts of the 204 mineworkers and other supervisors at the mine.

THICK-SEAM MINING

In production openings, the first pass through the thick seam removes a 10-ft-thick slab of bottom coal. In this phase of the work, face preparation is done on the first shift by the 2-man crew of a Joy 10-RU mining machine. Their normal cycle is to cut, drill and blast four places which are then cleaned up by a second-shift loading crew. First-shift loading, in places where the first pass has been completed, consists of cleaning up successive cuts of top coal which are dropped into the opening.

Second pass through the area consists of drilling from 3 to 5 ft of semitop coal with a rubber-tired CD-25 coal drill. The holes are drilled and charged from the floor which is left when the first pass has been completed.

TRIMMING HIGH RIBS and wetting down broken coal are two safety precautions included in Union Pacific's plans.



TOP-COAL DRILLERS, working on third pass through the seam, stand on broken coal from the previous top-coal cut.

RELIEF SPACE for initial cut through bottom coal is made at seam floor by rubber-tired universal cutting machine.

J. R. REUTER (left), mine superintendent, and W. J. Egan, resident engineer, provide supervision and control.

The broken semitop coal, in 80-ft-long cuts, then is loaded out to complete the second phase.

Final recovery of the top coal is made in a third pass through the opening. An initial cut of top coal is drilled from the original floor by angling the holes upward. The pile of broken coal from this initial cut provides an elevated platform from which drillers using hand-held electric drills prepare successive cuts of top coal by drilling horizontal holes into the top-coal face. About 4 ft of roof coal is left in place to increase roof safety.

The two bottom passes through the coal are driven from 20 to 22 ft wide, but the final pass through the top coal is from 40 to 50 ft wide to turn back the high ribs and to provide maximum recovery. Throughout the process the ribs are trimmed to prevent sloughing. These high-coal methods are pursued in rooms, where all openings in the initial pass are driven on 90-ft centers.

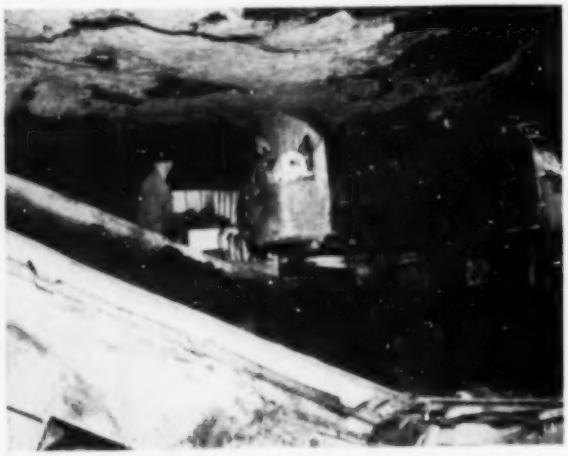
One of the machine-mining units is equipped with track-mounted machines, while five others are off-track units. Intermediate transportation, between loading machine and loading point, for two of the off-track units is provided by the new tracklaying shuttle cars.

TRACTOR-TREAD SHUTTLE CARS

Rooms at Hanna 4A are driven parallel to the strike of the seam, resulting in a side-pitching bottom. The new 8-ton tractor-tread shuttle cars have shown a high degree of stability in getting around under these conditions. On a 250-ft haul, one way, with 12-in sideboards, one of the new cars has transported up to 500 tons per shift and averages 350 tons per shift from the loading machine to the loading point in recovering top coal. According to R. F. Bowie, Union Pacific's planning and research engineer, power requirements in tramming empty or loading are reasonable and tramming speeds are satisfactory, as shown in the accompanying data.

A 4-ft seam height is the lower limit on Union Pacific operations. Since the new cars are only 42 in high without sideboards, they are usable in any seam in the company's mines. Other dimensions are: length, 23 ft; width, 89 in; road clearance 7⅜ in. The unit weighs 14 tons empty, but since that weight is carried on about 16 sq ft of tread area, the unit pressure on the roadway is only about 12 lb per square inch. Unit pressure with an 8-ton load is about 20 psi. This is a decided advantage at Hanna where

CRAWLER-MOUNTED SHUTTLE CAR features road-hugging ability in pitched rooms, is gentle with fire-clay floor.



HIGH-SPEED DISCHARGE into surge hopper of elevator takes mine-car spotting delays out of shuttle-car cycle.

ACCESSIBLE HAND HOLE permits easy replacement of shuttle-car fuses. Everybody at Hanna wears safety goggles.

the seam is floored on fireclay. The tracks effectively compact the tramway, and periodic grading at turning points is about the only road maintenance required.

In the operation at Hanna, the shuttle car discharges to a Joy elevating conveyor for loading the 4-ton mine cars which are placed at the loading point six at a time by the haulage crew.

The number of men in the crew varies with each pass through the workings, more drillers being added as the work goes into the semitop-and top-coal phases. Eight drillers work the top-coal phase, and the remainder of the crew includes a locomotive operator and a brakeman, a shuttle-car operator, a loading-machine operator and a unit foreman.

It is hoped that the road-hugging characteristics of the new cars will permit a change from strike rooms to pitch rooms in some areas, thus contributing to better roof control, faster recovery, higher extraction and mechanized recovery under deeper cover.

MINE LAYOUT AT HANNA

The main opening is an 8,000-ft slope with four headings, including a hoistway, manway and two airways serving a 9-ft Aerovane exhaust fan on the surface.

Triple-heading main entries are turned off the slope and are driven along the strike from the slope on 1,200- to 1,500-ft centers. The entries are driven water-level to the property limits. The mains are completely developed before room panels are opened. The panels are opened up by planes which are driven up the pitch from the mains on 800- to 1,200-ft centers, starting near the slope and working to the back of the property. Rooms are driven along the strike to a depth of about 600 ft (not less than 550 ft). Recovery of the panel starts at the bottom, leaving a 150-ft-wide barrier pillar to protect the mains. Working out a panel usually requires about 2 yr.

Goodman G-15 and G-20 uphill shaking conveyors with duckbills are used in driving the plane-and-manway headings up the pitch while loading machines and shuttle cars work in the strike rooms. When panels were recovered by track-mining methods, openings were turned at 60 deg, but with off-track mining all turns are 90 deg.

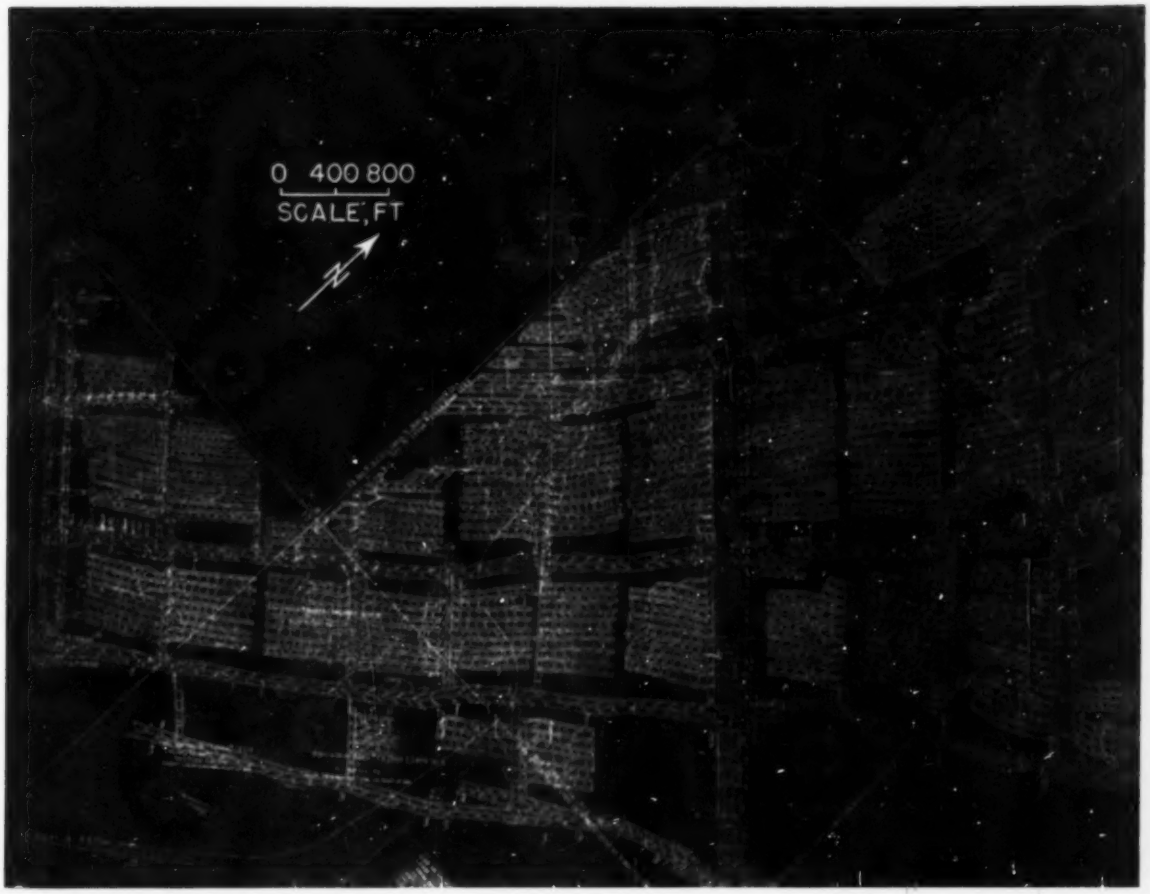
In some panels now being developed, where the pitch distance between mains is longer than normal because of variations in the lay of the seam, a duckbill-equipped shaking conveyor provides transportation from the face to a tandem panel belt. This method of operation permits more elastic scheduling of belt extensions and provides for conveyor lines of reasonable length for most effective pitch operation.

SERVICING THE WORKINGS

Gathering locomotives in the main entries haul the steel 4-ton mine cars from plane-and-entry junctions to the partings at the slope. The slope and active planes are

Tramming and Power Data, Tractor-Tread Shuttle Car

	Tramming Speed, Fpm		Power Required, Amp (250 v, DC)			
			Loaded		Empty	
Gradient:	Loaded	Empty	Max	Ave	Max	Ave
Level	300–350	300–350	250	150	250	125–150
20% up	170	180	325	200–250	300	200
20% down	300 (Safe)	350	150	0–50	150	0–50



STRIKE ENTRIES off main slope, planes up the pitch and strike rooms define mining methods at Hanna 4-A. Tandem hoisting and pumping in the main slope effectively remove the values and a waste by-product of mining.

equipped with two Vulcan hoists, one at the surface and the other 2,500 ft from the portal. The surface hoist is driven by two 400-hp motors and the inside hoist is driven by two 450-hp motors. The three panel hoists are a 125-hp Allis Chalmers, a 200-hp Nordberg and a 200-hp Vulcan. All hoists are reeved with 1⅜-in rope.

Trips of six cars are hauled up the slope at a rope speed of about 1,600 fpm by the two slope hoists working in tandem from a common landing in 2-North main, 1,600 ft from the portal. The surface hoist does not haul the cars all the way to the surface; it places them in an opening leading to an underground rock tunnel from where they are hauled 1,000 ft to the tipple by locomotive.

Drainage from the workings returns by gravity to the slope, where it is impounded in sump rooms which are constructed down the dip from the mains and adjacent to the slope. The water then is transferred to the next higher sump room or to the surface by centrifugal pumps. For example, one such pumping station, 6,000 ft down the slope, is equipped with a 150-hp, 500-gpm Allis-Chalmers pump which forces water from the lower workings through an 8-in discharge line to the 3-North sump room 3,000 ft up the slope. At 3-North is a similar pumping station which forces the water to the portal. A similar arrangement exists at the supply slope, 1 mi southwest of and parallel to the main slope.

Ventilation is provided by two 9-ft exhaust fans, an Aerovane and an Aerodyne, both exhausting 125,000 cfm at 1.6-in wg and both driven by 50-hp motors. Each panel is independently ventilated with air positively directed to the working faces in the rooms. Used air from each panel is overcasted into the main returns, the overcast at each panel being driven through the top coal. Worked-out panels are sealed. Test pipes are built into the seals to permit frequent testing of the atmosphere behind the seals. As a further precaution, the mine staff maintains a well-equipped mine-rescue station and the company diligently sponsors mine-rescue training. Wetting down broken coal, rock-dusting the working places and constructing rock-dust barriers are other Hanna precautions.

Electric power is obtained from Bureau of Reclamation facilities through the Southern Wyoming Utilities Co. Slope and panel hoists operate at 2,300 v AC, and underground equipment on 250 v DC. Underground conversion units include a mercury-arc rectifier and four m-g sets with a total rating of 1,300 kw. Sectionalizing circuit breakers monitor the mine circuit and adequate feeder lines are installed to provide effective face voltage.

Top management for Hanna and other Union Pacific properties in Wyoming is headed up by I. N. Bayless, president, with offices at Omaha, Neb. V. O. Murray, vice president—operations, J. B. Hughes, general manager, and C. E. Grosso, general superintendent, supervise field operations with headquarters at Rock Springs, Wyo. I. M. Charles is chief engineer, E. R. Henningsen is chief electrician and F. J. Peternell is safety engineer.

What Overcurrent Settings for DC Feeder Circuit Breakers?

By DONALD J. BAKER, Mining Representative
I-T-E Circuit Breaker Co., Pittsburgh, Pa.
And CLYDE L. BROWN, Mining Engineer (Electrical)
U. S. Bureau of Mines, Pittsburgh, Pa.

SELECTION OF OVERCURRENT SETTINGS for DC feeder circuit breakers in most coal mines is arbitrary or haphazard and, if the mine is unsectionalized, protection of substation apparatus is considered primary, with little thought to protecting circuits. Though it is now recognized that the large majority of mine fires are of electrical origin, overcurrent settings are too often far in excess of the values required for adequate protection against fire hazards resulting from fallen trolley wires and feeders. For safety and economy, protection of substations and circuits is equally important.

The accompanying tables have been developed as quick reference tabulations of acceptable current values for feeder circuit breakers. By their use directly, indirectly or by interpolation, safer overcurrent settings can become the rule rather than the exception.

GREATER HAZARDS TODAY

Modern mining methods, with increased power demands and extended distribution systems underground, involve greater electrical hazards and the possibilities of costly production delays as a result of inadequate electrical service. Where power requirements are large, for example, it is common practice because of the economics of power distribution to operate the conversion equipment in parallel. Unless well engineered, such installations may set up conditions that are potentially hazardous. When systems are extended beyond a practicable distance from conversion equipment, as they frequently are, a potential hazard is created through inadequate short-circuit protection.

Major reason for the frequency of underground fires is that too much overcurrent protection has been expected from too few devices. In the past, most applications of protective equipment have created the illusion that the circuits in the DC distribution system could be protected by the same breakers that guard the substation. Now, it is more widely understood that problems of protecting substations and feeder circuits actually have little in common.

Two other reasons for poor protection of feeder circuits are: (1) the simple formulas for determining safe current settings are not well understood by many mine electricians or, under pressure of daily duties, they do not have time to develop them; and (2) few men recognize the need for periodic testing of all breakers to determine if a fire could be started.

Test of a circuit breaker is very simple and is always the best check. First open the breaker and then establish a short from the trolley to the rail at the end of the trolley wire or feeder. If the breaker is of the automatic reclosing type, it should be impossible for it to close; or if of the manual type, it should be impossible for the breaker to be kept closed.

MAIN-HAULAGE CIRCUIT

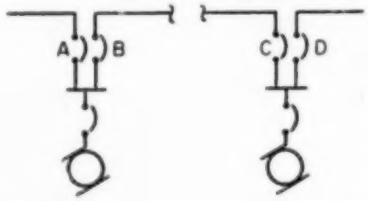


TABLE I indicates maximum circuit-breaker settings for Breakers "B" and "C", the inby and outby circuits at Substations 1 and 2. Settings would insure Breakers B and C opening in case of a fault near the opposite end of either feeder.

STUB-END FEEDER

TABLE II indicates maximum circuit-breaker settings for any breaker controlling the current input into a stub-end feeder. Settings would insure breaker opening in case of a fault near the end of the feeder.

GOOD PRACTICE DEFINED

In recent years, progress has been made in reducing mine fire hazards by use of more sectionalizing equipment. Recommended sectionalizing practice, approved by the American Mining Congress and presented in AIEE Misc. Paper 48-65, "The New Sectionalizing Application Standards," has been developed by the American Standards Association as the "American Standard Safety Code of Installing and Using Electrical Equipment in and About Coal Mines (M2.1)." This ASA Code is issued as USBM Bulletin No. 514 (20c a copy, Supt. of Documents, Government Printing Office, Washington 25). Since the ASA Code defines good practice which, it is believed, will eventually be written into state and federal mining statutes, this study recommends only settings for protection of circuits described in general Section 5.6.8 of this Code.

In preparing these tabulations, typical distribution plans of many large and representative mines were studied before selecting examples of distances, cable and trolley-wire sizes and track weights. While the examples do not cover all cases, they probably apply to the majority. Interpolation for a particular circuit not covered will not be difficult.

PRACTICABLE FORMULAS USED

The maximum current settings were determined from the formula:

$$\text{Amperes} = \frac{\text{V (system volts)}}{R_1 \text{ (feeder cable and trolley wire)} + R_2 \text{ (track)}}$$

(Continued on p. 89)

Adapted from a paper presented at the AIEE Middle Eastern District Meeting, Charleston, W. Va., Sept. 29, 1953.

Table I—Resistance and Short-Circuit Capacity, DC Power Circuits (Multiple-Feeder Applications, Not Sectionalized)

Distance Between Substations	Feeder Cable Size, Cir Mils	Trolley-Wire Size	Rail Weight, Lb Per Yard	Total Copper Resistance, Ohm	Total Track Resistance, Ohm	Total Circuit Resistance, Ohm	Max. Instantaneous Current-amperes	
							At 275 v	At 290 v
2 Mi (10,560 Ft)	1,500,000	9 Section	90	0.058803	0.062645	0.121448	2264	2388
			70		.080543	.139346	1974	2081
			90		.062645	.142448	1931	2036
	1,000,000		70	.079803	.080543	.160346	1715	1809
1 7/8 Mi (9900 Ft)	1,500,000	9 Section	90	.055127	.058729	.113856	2415	2547
			70		.075509	.130636	2105	2220
			90		.058729	.133545	2059	2172
	1,000,000		70	.074816	.075509	.150325	1829	1929
1 3/4 Mi (9240 Ft)	1,500,000	9 Section	90	.051452	.054814	.106266	2588	2729
			70		.070475	.121927	2255	2378
			90		.054814	.124642	2206	2327
	1,000,000		70	.069828	.070475	.140303	1960	2067
1 5/8 Mi (8580 Ft)	1,500,000	9 Section	90	.047777	.050899	.098676	2787	2939
			70		.065441	.113218	2429	2561
			90		.050899	.115739	2376	2506
	1,000,000		70	.064840	.065441	.130281	2111	2226
1 1/2 Mi (7920 Ft)	1,500,000	9 Section	90	.044102	.046983	.091085	3019	3184
			70		.060407	.104509	2631	2775
			90		.046983	.106836	2574	2714
	1,000,000		70	.059853	.060407	.120260	2287	2411
1 3/8 Mi (7260 Ft)	1,500,000	9 Section	90	.040427	.043068	.083495	3294	3473
			70		.055373	.095800	2871	3027
			90		.043068	.097933	2808	2961
	1,000,000		70	.054865	.055373	.110238	2495	2631
1 1/4 Mi (6600 Ft)	1,500,000	9 Section	90	.036752	.039153	.075905	3623	3821
			70		.050339	.087091	3157	3330
			90		.039153	.089030	3089	3257
	1,000,000		70	.049877	.050339	.100216	2744	2894
1 1/8 Mi (5940 Ft)	1,000,000	9 Section	90	.044889	.035238	.080127	3432	3619
			70		.045305	.090194	3049	3215
			70		.045305	.115133	2389	2519
	500,000		60	.069828	.052856	.122684	2242	2364
1 Mi (5280 Ft)	1,000,000	9 Section	90	.039902	.031322	.071224	3861	4072
			70		.040272	.080174	3430	3617
			70		.040272	.102341	2687	2834
	500,000		60	.062069	.046983	.109052	2522	2659
7/8 Mi (4620 Ft)	1,000,000	9 Section	70	.034914	.035238	.070152	3920	4134
			60		.041111	.076025	3617	3815
			70		.035238	.089549	3071	3238
	500,000		60	.054311	.041111	.095422	2882	3039
3/4 Mi (3960 Ft)	1,000,000	9 Section	70	.029926	.030204	.060130	4574	4823
			60		.035238	.065164	4220	4450
			70		.030204	.076756	3583	3778
	500,000		60	.046552	.035238	.081790	3362	3546
5/8 Mi (3300 Ft)	1,000,000	9 Section	70	.024939	.025170	.050109	5488	5787
			60		.029365	.054304	5064	5340
			70		.025170	.063963	4299	4534
	500,000		60	.038793	.029365	.068158	4035	4255
1/2 Mi (2640 Ft)	1,000,000	9 Section	70	.019951	.020136	.040087	6860	7234
			60		.023492	.043443	6330	6675
			70		.020136	.051171	5374	5667
	500,000		60	.031035	.023492	.054527	5043	5318

NOTES, TABLES I AND II—Overcurrent-setting values in the two right-hand columns generally should be reduced by 5% to insure safe ampere selections on overcurrent relays with close calibrations. If track bonds are known to be in mediocre condition, it would be worthwhile to further reduce the values by 10 to 20%, but this step may be disregarded by mines using welded rail or a separate adequate negative cable for the return circuit. For distances not shown in the tables, it would be good practice to select the next greatest distance. Every 6 mo, or oftener if required, new settings should be selected for distances known to have increased since the last settings. Circuit-breaker settings for 550-v service may be obtained, of course, by taking half the values listed for 275 v.

Table II—Resistance and Short-Circuit Capacity, DC Power Circuits (Stub-Feeder Applications)

Length of Feeder	Feeder Size, Cir Mils	Trolley-Wire Size	Rail Weight, Lb Per Yard	Total Copper Resistance, Ohm	Total Track Resistance, Ohm	Total Circuit Resistance, Ohm	Max. Instantaneous Current-amperes	
							At 275 v	At 290 v
2 Mi (10,560 Ft)	1,000,000	9 Section	50	0.079803	0.112760	0.192563	1428	1506
	500,000		40	.124139	.140950	.265089	1037	1094
	1,000,000	4/0	50	.092213	.112760	.204973	1342	1415
	500,000		40	.157005	.140950	.297955	923	973
1 7/8 Mi (9,900 Ft)	1,000,000	9 Section	50	.074816	.105713	.180529	1523	1606
	500,000		40	.116380	.132141	.248521	1107	1167
	1,000,000	4/0	50	.086449	.105713	.192162	1431	1509
	500,000		40	.147192	.132141	.279333	984	1038
1 3/4 Mi (9,240 Ft)	1,000,000	9 Section	50	.069828	.098665	.168493	1632	1721
	500,000		40	.108621	.123332	.231953	1186	1250
	1,000,000	4/0	50	.080686	.098665	.179351	1533	1617
	500,000		40	.137379	.123332	.260711	1055	1112
1 5/8 Mi (8,580 Ft)	1,000,000	9 Section	50	.064840	.091618	.156458	1758	1854
	500,000		40	.100863	.114522	.215385	1277	1346
	1,000,000	4/0	50	.074923	.091618	.166541	1651	1741
	500,000		40	.127567	.114522	.242089	1136	1198
1 1/2 Mi (7,920 Ft)	1,000,000	9 Section	50	.059853	.084570	.144423	1904	2008
	500,000		40	.093104	.105713	.198817	1383	1459
	1,000,000	4/0	50	.069159	.084570	.153729	1789	1886
	500,000		40	.117754	.105713	.223467	1231	1298
1 3/8 Mi (7,260 Ft)	1,000,000	9 Section	50	.054865	.077523	.132388	2077	2191
	500,000		40	.085345	.096903	.182248	1509	1591
	1,000,000	4/0	50	.063396	.077523	.140919	1951	2058
	500,000		40	.107941	.096903	.204844	1342	1416
1 1/4 Mi (6,600 Ft)	1,000,000	9 Section	50	.049877	.070475	.120352	2285	2410
	500,000		40	.077587	.088094	.165681	1660	1750
	1,000,000	4/0	50	.057633	.070475	.128108	2147	2264
	500,000		40	.098128	.088094	.186222	1477	1557
1 1/8 Mi (5,940 Ft)	1,000,000	9 Section	50	.044889	.063428	.108317	2539	2677
	500,000		40	.069828	.079285	.149113	1844	1945
	1,000,000	4/0	50	.051870	.063428	.115298	2385	2515
	500,000		40	.088315	.079285	.167600	1641	1730
1 Mi (5,280 Ft)	1,000,000	9 Section	50	.039902	.056380	.096282	2856	3012
		4/0	40	.046106	.070475	.116581	2359	2488
	500,000	4/0	50	.078503	.056380	.134883	2039	2150
		9 Section	40	.062069	.070475	.132544	2075	2188
7/8 Mi (4,620 Ft)	1,000,000	9 Section	50	.034914	.049333	.084247	3264	3442
		4/0	40	.040343	.061666	.102009	2696	2843
	500,000	4/0	50	.068690	.049333	.118023	2330	2457
		9 Section	40	.054311	.061666	.115977	2371	2500
3/4 Mi (3,960 Ft)	1,000,000	9 Section	50	.029926	.042285	.072211	3808	4016
		4/0	40	.034580	.052856	.087436	3145	3317
	500,000	9 Section	50	.046552	.042285	.088837	3096	3264
		4/0	40	.058877	.052856	.111733	2461	2595
5/8 Mi (3,300 Ft)	1,000,000	9 Section	50	.024939	.035238	.060177	4570	4819
			40		.044047	.068986	3986	4204
	500,000	4/0	50	.049064	.035238	.084302	3262	3440
			40		.044047	.093111	2953	3115
1/2 Mi (2,640 Ft)		9 Section	50	.069828	.028190	.098018	2806	2959
		4/0	40	.132000	.035238	.167238	1644	1734
		4/0	50	.132000	.028190	.160190	1717	1810
		9 Section	40	.069828	.035238	.105066	2617	2760
1/4 Mi (1,320 Ft)		9 Section	50	.034914	.014095	.049009	5611	5917
		4/0	40	.066000	.017619	.083619	3289	3468
		4/0	50	.066000	.014095	.080095	3433	3621
		9 Section	40	.034914	.017619	.052533	5235	5520

Copper resistance was determined by:

$$R_1 \text{ (ohms)} = \frac{\text{Distance (feet)} \times 10.58}{\text{(area of feeder cable + area of trolley wire) circ mils}}$$

Track resistances were determined from:

$$R_2 \text{ (ohms)} = \frac{\text{Distance (feet)}}{\text{Pounds (per yd of rail)} \times 1873}$$

These formulas are considered more practicable than those requiring handbook reference tables, since they permit resistance values to be computed on the spot. It is hoped the industry will make greater use of them for circuit conditions the tables do not cover. Because of the involved calculations required, some unsectionalized circuits, such as long main haulageway systems fed by a number of substations, were not considered in preparing the tables. To fully protect such long multiple-fed circuits, it is necessary that sectionalizing equipment should be properly installed and the correct overcurrent settings determined.

Calculations for both tables are based on Paragraphs 5.6.8.2, 5.6.8.4, 5.6.8.5, 5.6.8.6 and 5.6.8.9 of ASA Code, M2.1. Generally, circuit conditions in Table I are found in main haulageways fed by more than one substation; in Table II, in so-called main-branch, secondary-branch and mining-section circuits.

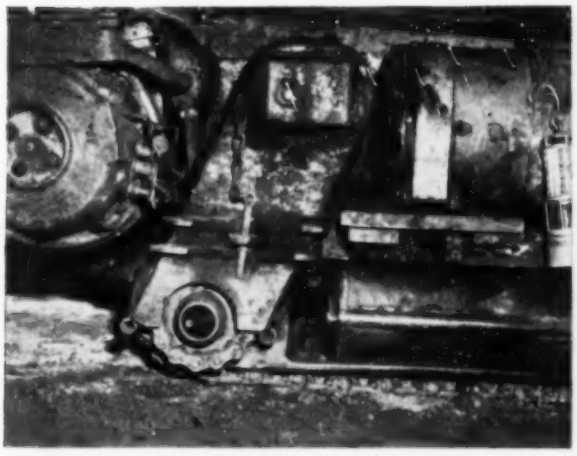
PROTECTING SUBSTATIONS

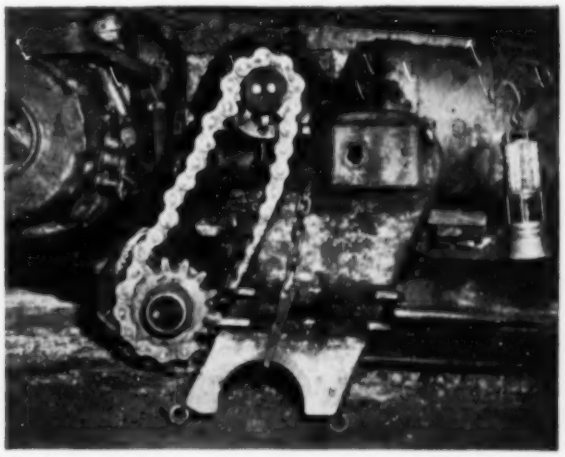
Paragraph 5.6.8.2 of the Code states: "An overcurrent protective device should be installed in the circuit between each two substations. This device should be installed at such a point that resistance between each station and the device is approximately the same. If enough copper is used so that a short circuit at any place will open the devices at both substations, no intermediate protection need be installed. A sectional insulator or so-called dead-block may be used between the substations if parallel operation with other substations is not necessary for satisfactory power service." Table I also may be used to determine settings in sectionalizing adjoining substations. It is necessary only to take one-half the current values listed for unsectionalized circuits between substations for the so-called "tie" circuit breaker when the location is to be about midway between stations.

Paragraph 5.6.8.4 states: "An overcurrent protective device shall be placed in each circuit leaving a substation. These may be fuses or circuit breakers of the manual or automatic reclosing type. (If circuit breakers are employed, trip-free operating mechanism shall be used.) Where a substation feeds the main haulage only, and only one haulage unit at a time, only one breaker is required at the station." Table I applies especially to protective devices mentioned in this application and the values may be selected for both the inby and outby breakers.

Other paragraphs in the Code state generally that overcurrent protective devices shall be placed at the beginning of all main-branch, secondary and mining-section circuits. Table II applies to such applications.

In many small mines, however, circuit conditions are such that settings given in the tables are not applicable. It is recognized that the industry has many low-quality circuits to which it would be imprudent to apply overcurrent protection devices, since settings would have to be so low that little legitimate load could be tolerated. However, until such mines improve circuit conditions, they will continue to pay a heavy premium in annealed copper, costly equipment maintenance and lost tonnage from delays, to say nothing of hazards to life and property.



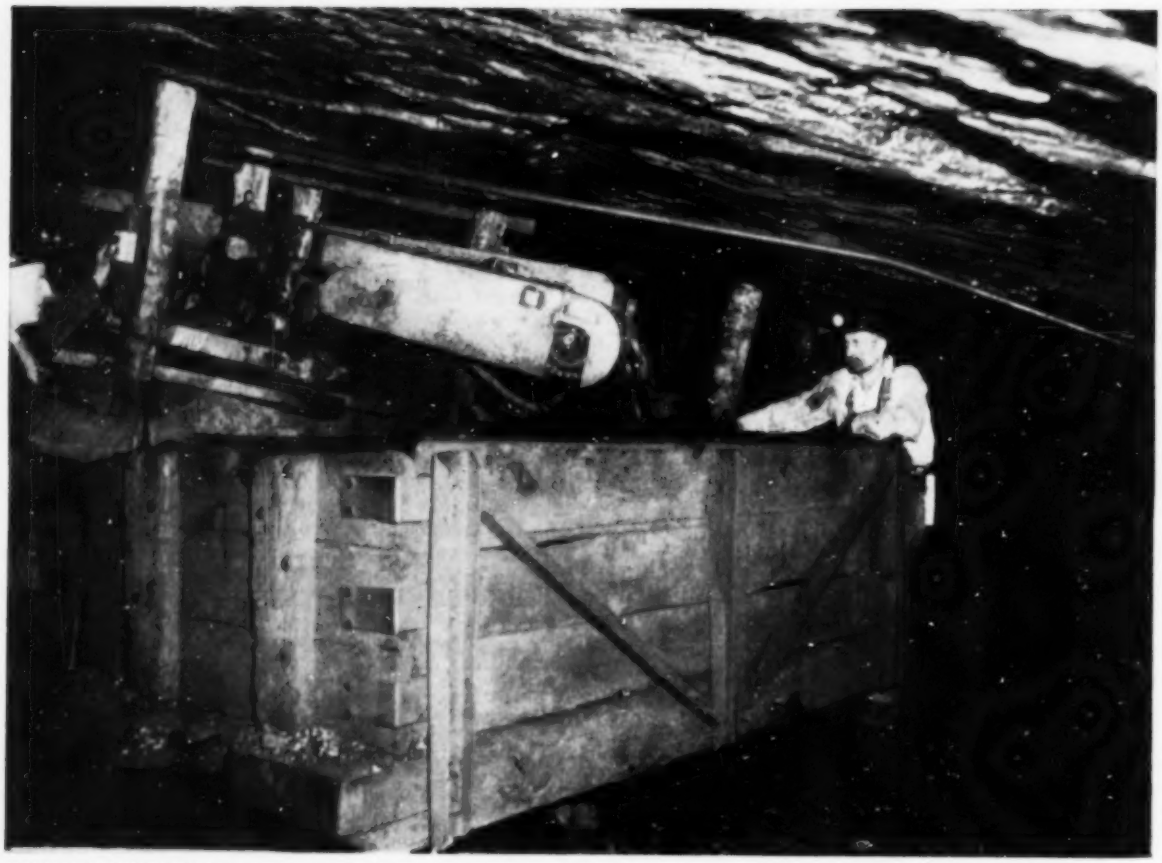


GUARD HELD SECURELY by one wedge . . . comes off in a jiffy for a side-chain repair job. Note spare links carried permanently on the loader (left of the chain).

Better Chain Guards Save 15 Min in Loader Maintenance

A SAVING OF 15 MIN on each side-chain repair job or inspection on 14-BU loaders is the way improved guard attachments built in its central shop by the Consolidation Coal Co. (Ky.), Jenkins, Ky., have paid off.

Instead of the guard being fastened by the four original socket-head bolts which required a special wrench and were placed mostly in positions difficult to get at, it now is held by only one wedge that can be easily loosened and reset with a light hammer. A short chain confines the wedge to the guard so that it cannot be lost. In making this change, the company followed the lead of others which have seen fit to simplify the guard attachment.



CHAIN CONVEYORS transport coal both up and down the 20% grades in recovering the 10-ft-thick Primrose vein. Conveyors like this one are used in driving the breasts, in advancing gangways and in sinking dip headings.

Chain conveyors discharging into mine cars help increase productivity in . . .

Mining a Moderate-Pitch Vein

Effective use of chain conveyors permits rapid development without production interference in recovering red-ash anthracite from Primrose vein at Michael mine, Fisher Associates, Inc., Tremont, Pa.

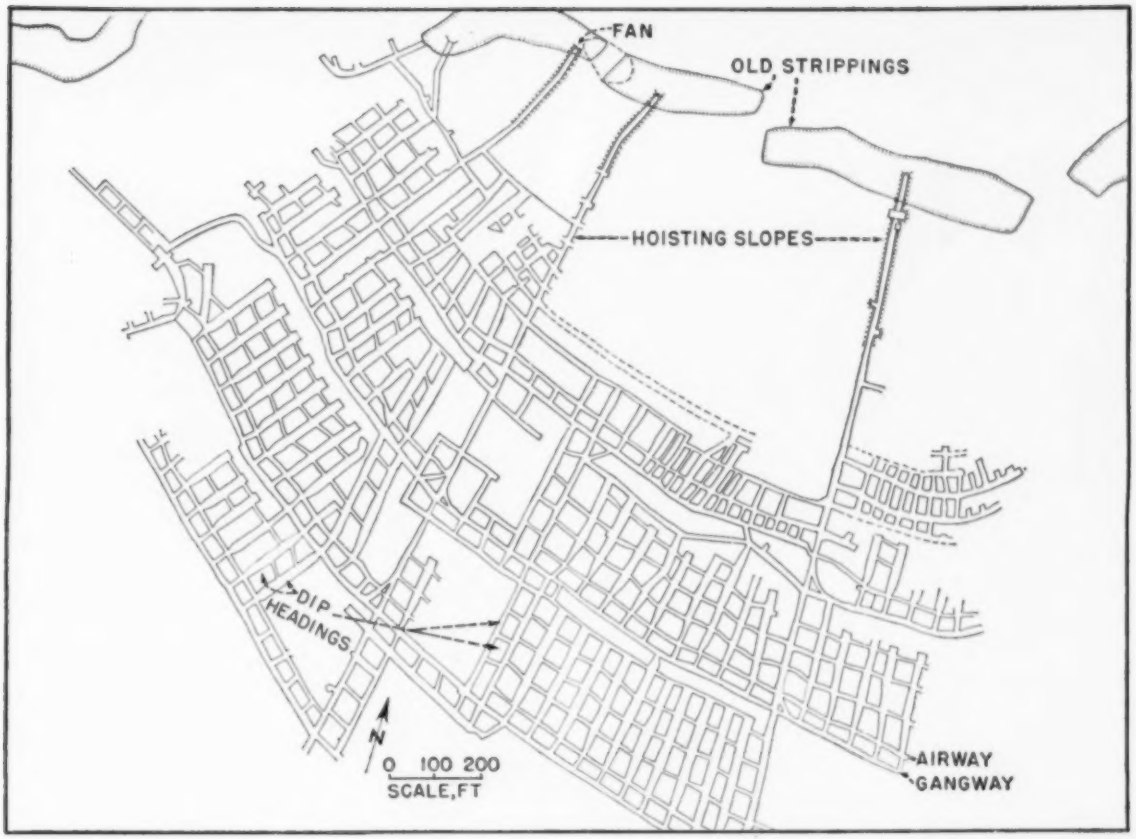
IN MAINTAINING A TONS-PER-MAN-SHIFT FIGURE far above anthracite's regional average, officials at Michael mine, Fisher Associates, Inc., Tremont, Pa., employ chain conveyors extensively in mining red-ash coal from the 8- to 10-ft thick Primrose vein. With 115 men at the mine, 100 underground, production from 21 working places, including four gangways, is running close to 675 tons per day (two shifts). With the addition of new haulage equipment already on the property, production is expected to average 1,100 tpd by Feb. 1, 1954.

According to J. Harold Fisher, president of the company, mining is concentrated in the Primrose because of the red-ash characteristics of the vein in the Tremont locality. The coal finds favor in Canadian markets where dust-free combustion with "high-volatile," low-ash anthracite is desired. As Mr. Fisher points out, numerous church buildings have expensive works of art are preferably heated with anthracite because of its cleanliness, and the red-ash coal is the best fuel for their burners.

Average pitch of the vein is about 20 deg, except in local areas where it may reach sheet-iron gradient. Chain conveyors are used in driving both dip and pitch openings, although sheet-iron chutes are used in uphill places where the pitch exceeds 28 deg. Gangways are driven with conveyors, but as soon as room for a turnout from the slope is available the gangway conveyors are replaced by track and mine-car haulage to handle supplies and production.

HOW THE MINE IS LAID OUT

As shown in the accompanying mine map, the workings are being developed outward from the two



TWO HOISTING SLOPES and an air opening penetrate the Primrose vein. Gangways are driven from the slope on 300-ft centers, and breasts are driven up-pitch 18 ft wide on 55-ft centers in "first" mining.

slopes, the area between the slopes having been first mined by Fisher Associates and predecessors.

Gangways are turned from the slope on 300-ft centers in opening up successive lower levels and airways are driven above and parallel to the gangways at a distance of 30 ft. The 300-ft lifts are first-mined as the gangways advance by raising 18-ft-wide breasts up the pitch on 55-ft centers, beginning at the slope. Crossheadings between breasts are driven on 60-ft centers, but these are offset from each other in adjacent pillars to prevent the formation of lines of weakness across a lift. The offset interval is 30 ft. A 60-ft-wide pillar is left between the slope and first breast and a 50-ft pillar between breasts and the gangway of the next higher level.

The slopes now are about 1,600 ft long, and much of this distance has been provided without exposing slope crews to the hazards of slope haulage. Furthermore, the work of extending the slope may proceed concurrently with production operations.

When the slope is to be extended, a pair of dip headings are driven parallel to and about 200 ft away from the slope projection down to the projection of the next lower gangway. A strike opening then is worked back to the slope projection, from where the new addition to the slope is raised to intersect the existing portion. Hoisting from the new lower level can commence as soon as the slope track is installed. Hoists at each slope, driven by 175-hp motors, handle three cars per trip.

In this work, the coal is transported from the lower workings on chain conveyors to a loading point in the upper active gangway. The conveyors also raise production coal from lower workings to higher loading points until track can be installed in the lower-level gangway.

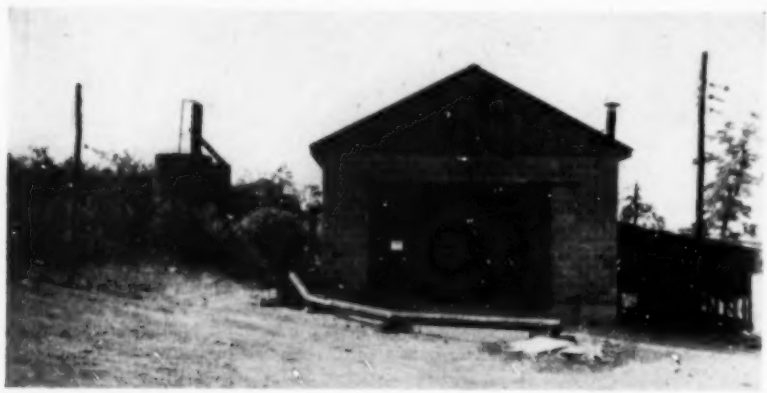
HOW THE COAL IS MINED

Two men work each of the 21 active places. The coal is shot from the solid after it is drilled with pneumatic percussion drills. Usually, 11 holes are required to drop a 6-ft-deep cut, the round being detonated through electric delay caps. One cut per shift, along with placing necessary roof supports is a good day's work. The timbering plan requires props on 6-ft centers in the breasts and 3-piece timber sets on 5-ft centers in the gangways.

The coal is hand-loaded into the conveyors, but in the 12-ft-wide gangways the loading job is speeded through the use of a special technique. Opening holes are shot in the center of the face to open a V-cut. The conveyor line is extended into the V-cut, then covered with short boards. The remaining holes are shot on top of the protected conveyor line, and more than half the cut can be fed into the conveyor by removing the boards one after another. The remaining loose coal is hand loaded into the conveyor. As a safety precaution, long holes are drilled ahead of gangway faces in compliance with mine laws to detect bodies of water or pockets of gas that might lie ahead. The area has been worked in the past through bootleg holes, and

UPHILL CONVEYOR elevates coal from 4th level to gathering conveyor in 3rd level gangway which discharges into mine cars.

JOHN DUNKLE (right), supt., and John Kunigonis, foreman, supervise safe mining.



COMPRESSED AIR for underground tools is piped through 287-ft-deep borehole to underground receiver. Water tank at left provides coolant for compressors.

in many instances surface indications of these holes have been erased through stripping operations carried on since.

A protective device on conveyors which transport coal up the pitch prevents the chain from running back down the pan line in the event the chain should break. The "kicker," as it is called, is a ladder-like piece made of two side rails reinforced by transverse struts. The kicker is suspended from the roof over the conveyor with the bottom free end riding in the conveyor. The suspension point at the roof is hinged to permit free action. The bottom of the kicker which rides in the conveyor is covered with steel shoes to prevent rapid wear as each flight of the upwardly moving chain picks up the bottom of the kicker, passes under it and drops it back into the pan. If the chain should break, the flights in sliding backward will engage the bottom of the kicker siderails as they rest in the bottom of the pan, thus effectively holding the chain and preventing a pileup at the bottom of the conveyor. Length and pitch of the kicker are adjusted to the pitch of the conveyor to prevent the broken chain from pulling the bottom of the kicker back under the suspension point.

In the gangways where track already is installed, the breast and lower-workings conveyors discharge directly to mine cars. Two sizes of car are in service, the smaller holding 1.8 tons and the larger, 2.7 tons. The gangway haulage units are two battery-powered locomotives, which are parked off shift at charging stations near the slope.

PROVIDING PRODUCTION SERVICES

Compressed air is provided by a Chicago Pneumatic stationary compressor driven by a 150-hp synchronous motor and by an auxiliary Ingersoll-Rand Type 75-BH portable compressor. The compressed air is stored in two surface receivers and introduced to the underground receiver through a 287-ft-deep borehole.

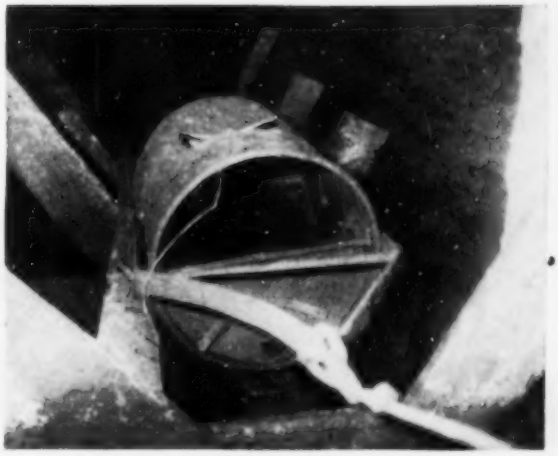
Ventilating air is moved by an exhaust fan installed at a rock slope which enters the south workings. The intake air is carried down the slopes, through the gangways, past the active working faces and then is overcast across the hoisting slopes and returned to the fan at the air slope. Another fan is to be added soon, however, to permit each side of the mine to be ventilated independently, thus eliminating the need of such overcasts.

Concrete-block stoppings are built at each chute to isolate the gangway from the monkey airway. Two holes are left through each of these stoppings, one for the conveyor and the other for a manway, but both of these are sealed after the breast has been driven to its upper limit and the conveyor removed. While the breast is active the openings in the stopping are covered by brattice-cloth curtains.

In the breasts the air is carried to the face around brattice-cloth curtains built off the lower corner of the last open crossheading.

The overcasts are built of 1x8-in planks and are made airtight and noncombustible by plastering the inside

AIR MOVER, operated by compressed air and having no moving parts, ventilates gangway face through tubing.



SHOP-MADE SILT CLEANER is hoisted in and out of drainage sumps to load out accumulated sludge.

CINDER-BLOCK STOPPING, with manway and conveyorway, provides positive air control for better ventilation.

BUILT-IN OVERCASTS are made of wood with an inner lining of mortar over wire mesh for safety and tightness.

with neat mortar over chicken-wire reinforcement stapled to the wood.

Gangway faces are ventilated by MSA-Lamb air movers and ventilation tubing in lieu of auxiliary booster fans. The air mover has no electric elements and no moving parts. It is installed outby the last open chute and connected to the compressed-air line. In passing through the bell and out through the horn of the mover, the stream of compressed air expands and carries fresh air from the outby portion of the gangway through the tubing to the face.

Under a pressure of 50 psi at the compressed-air connection, the 6-in air mover will cause a volume of 2,250 cfm to flow. The lightweight unit is easily moved up and quickly installed. At Michael mine it is particularly effective in clearing from gangway faces the smoke and fumes of blasting.

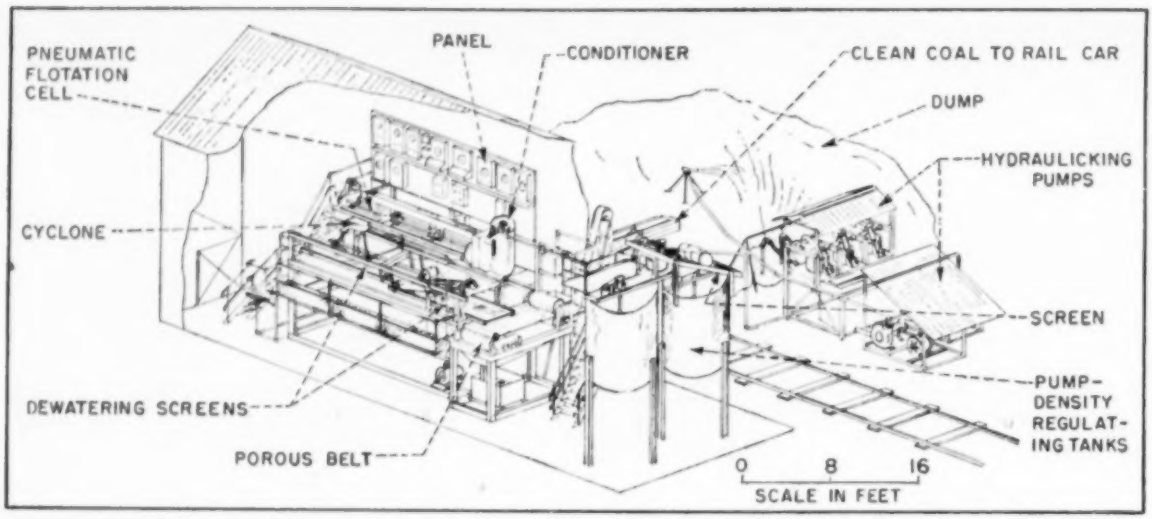
Another worthwhile kink is a shop-made bail for keeping sumps free of silt. The bail is made of a 55-gal drum, cut and fitted as shown in the accompanying photo. A wood slide carries the bail in and out of the water, and the slide may be extended to mine-car height when the sump needs cleaning. The unit is powered by a small hoist set into the upper rib of the gangway, thus the silt is hoisted out of the sump and dumped into mine cars in the gangway.

PREPARING THE PRODUCT

Mr. Fisher's figures show that about 80% of the mine product is recovered as standard anthracite at the cleaning plant, and that about 61% of this recovery is in the prepared sizes including stove, nut and pea coal. Pea and larger sizes are cleaned in three Wilmot jigs; buckwheat, rice and barley are cleaned in three Wilmot hydrotators. Nos. 4 and 5 coal are cleaned on four Deister SuperDuty Diagonal-Deck tables which are fed through a single Concenco distributor.

A double-roll crusher, recently installed in the plant at Schuylkill Haven, may be fed with the larger sizes from the final sizing screen to increase the rice and barley yield, thus increasing the flexibility of the plant and reducing need for storage.

Other members of the management team in the Pottsville office are Louis Fisher, vice president, and Theodore Zerbe, chief engineer. John Dunkle is mine superintendent, and John Kunigonis is mine foreman. Walter and William Heinbach, a father-and-son team, are assistant foremen. George Sterling is mining engineer, Daniel Derr is master mechanic, and Patrick Dowling supervises operations at the cleaning plant.



MOBILE FROTH-FLOTATION PLANT shown here in perspective provides 5½ tons of clean coal per hour and is operated by two men. It breaks down into 30 sections for moving and includes repulping and dewatering facilities.

Low-Cost Froth Flotation

Portable plant for British mines recovers 5½ tph of clean fine coal with only two operators.

By D. H. GREGORY, D. SIMPSON and P. F. WHELAN
Central Research Establishment, National Coal Board, Cheltenham, England

FLOTATION in portable equipment is now adding to the coal supply in Great Britain by recovering fines from old ponds and slurry dumps, plus fines which would be discarded at existing plants as a result of conditions unfavorable to the installation of fine-coal additions.

Development of the portable flotation plant reflects changes in the coal picture in Great Britain since World War II. Demand for coal increased while inability to expand the mining force appreciably made it difficult to increase output. In addition, a major extension of machine mining underground increased the production of high-ash fines.

As a result of these and other developments, fine coal formerly discarded because it had no market value is today cleaned by froth flotation and blended into the coarser sizes or made into an attractive smokeless fuel by briquetting and carbonizing. More-stringent antipollution ordinances in recent years have accentuated this trend. No less than 2½ million long tons, or 2¾ short tons, of clean fine coal are recovered annually in Great Britain by froth flotation.

Although all new British coal-preparation plants include suitable froth-flotation facilities, circumstances are not always favorable to the installation of such equipment. The exceptions are:

1. Old ponds and slurry dumps where reclamation must precede cleaning.

2. Old mines nearing the end of their lives, which constitute a sizable number of the 800 operations in Great Britain, and where installation of fine-coal plants would not be justified for that reason.

3. Existing operations where plants designed only for coarse-coal cleaning are to be replaced by central washeries serving several mines.

NEED AND SOLUTION

In all these instances, the need was for a plant which, though not perfect for any particular location, is versatile enough to provide a reasonable performance almost anywhere. The answer was a portable plant, which was designed and built at the Central Research Establishment of the National Coal Board, Cheltenham, in 1951, and was extensively tested in the field during 1952.

Study of conditions at sites where the plant might be used placed its capacity at 5½ short tons per hour. This low rating had an overriding influence on design, and brought up the problem of matching low capital charges and small throughput with reasonably high efficiency and ease of movement from one site to another. Fortunately, a survey showed that if minus ⅛-in fines were adequately cleaned, the small quantity of plus ⅛ could be mixed in without treatment because of its low ash content. Any plus ½-in in dumps was mostly barren and could be discarded without much loss of coal.

A hydraulicking system for repulping the slurry, incorporating a screen to eliminate plus ½, is therefore followed by screening at ⅛, the plus ⅛ going directly to the railroad cars while the minus ⅛ enters storage tanks where surges in pulp density are evened out. Since only single-stage flotation is required for the majority of the coals, a simple pneumatic cell is employed instead of the more-cumbersome mechanical type.

A rotary vacuum filter and drier are out of place in such a small plant on the grounds of both cost and weight, so an alternative method of dewatering froth had to be found. Some very-fine high-ash coal is intentionally dis-

Operating Cost, Mobile Flotation Plant

	£ per Year	Pence per Short Ton of Product
Amortization, 5% on £15,000	750	16
Interest, 5% on £15,000	750	16
Repairs and maintenance	1,000	21½
Power, 92 kwh per ton, 0.85d per kwh	650	14
Labor, two men at £7.10.0 per wk.	650	13½
Reagent, 3d per lb.	190	4
	3,970	85 or £0.35

carded so that the bulk of the froth can be caught by a shaking screen and a porous-belt device in a form that drains naturally in standing in rail cars to a sufficient low moisture.

With these simplifications, and by devising a very-compact layout, plant cost was kept down to £15,000, or £2,700 per short ton of clean coal per hour.

Under average field conditions, 8¼ short tons of input per hour with an ash of 25% yield 1 tph of plus ⅛ and 4½ tph of minus ⅛ clean coal, both containing 12¼% ash. Laboratory tests show the lowest ash content to be 11¼% for a similar weight recovery. Therefore, cleaning is as good as can be expected. The clean 5½ tph has 30% of moisture associated with it, but after 36 hr in the rail car this drops to 10 to 12%.

A mixture of two volumes of creosote and one volume of crude cresylic acid serves as the flotation reagent. Consumption is 1.3 lb per short ton of product. Water requirements are 1,900 U. S. gal per ton of product.

Two men run the plant—one hydraulicking and the other controlling the main plant from an electric-supply panel alongside the flotation cell. Power consumption is 16½ kwh per ton of product, about half for reclaiming. The time required to dismantle the plant, move it 100 mi and reassemble is 6 wk. Cost of the transfer is £1,000. The operating cost is shown in the accompanying table.

RECLAMATION

Settled slurry is brought into suspension by hydraulicking at 40 psi through three ¾-in-diameter nozzles. The pulp so produced runs without settling on a slope of 4 deg, or even less. It is picked up by 5-in adjustable-stroke Denver Triplex diaphragm pumps, two units delivering to a 4-in Wilfley pump connected to the hydraulicking pipe line and a third feeding a 2-in Wilfley pump moving the "make" to the main plant up to 1,000 ft away. A ½-in fixed screen between diaphragm and centrifugal pumps removes occasional lumps, mostly refuse. Makeup water is added at the 4-in Wilfley pump. About 100 gpm with a solids content of 20 to 30% is produced, the quantity circulated being somewhat less than twice as much.

An electrically vibrated screen fitted with 6x3 ft of ⅛-in cloth separates plus ⅛, which goes directly to the rail car, from an underflow of minus ⅛ dirty fine coal. The pulp is passed in succession through two 6x9-ft cylindrical agitated tanks where variations in pulp density are evened out so that a 5-in adjustable-stroke Denver diaphragm pump coupled to the second tank delivers a steady flotation feed of 7¼ tph, or 160 gpm, 17½% solids, 35% minus 100-mesh Tyler. A Geco automatic sampler cuts the pulp stream from the diaphragm pump at 10-min intervals.

FLOTATION

The pulp is conditioned with reagents in a 19-cu ft stirred tank fitted with four radial baffles to insure that the feed, which enters the quadrant opposite the discharge, must pass through the updrafting standpipe. Reagent addition is carefully controlled by a diaphragm pump with a variable capacity ranging from 0.001 to 0.010 cfm.

The flotation cell is modeled on the original Callow Type, and is 2 ft deep at the feed end and 4½ ft deep at the discharge end. The aerating porous bottom, 18 in wide and 12 ft long, slopes 12 deg toward the outlet end. A fine-weave nylon blanket provides a large number of bubbles of uniform size and lasts at least 1,000 hr. A replacement can be fitted in 8 man-hr.

Because of the bulky nature of the coal froth, the top of the cell is splayed out to a width of 2 ft, and longitudinal paddles rotating at 5 rpm are provided to help the froth over the overflow lip which, in this instance, runs along one side of the cell only.

Air consumption is 46 cfm at 7 psi. Power consumption of the small compressor and paddle drive, at 0.58 kwh per short ton of clean coal in the froth, is remarkably low. Tailings escape is controlled by a cone valve and overflow. The quantity is 2¼ tph, or 115 gpm, 8% solids, 27% minus 100 mesh. Before going to refuse, the tails are cut at 10-min intervals by a Geco sampler.

Froth equivalent to 5 tph dry, or 45 gpm, 40% solids, 40% minus 100-mesh, flows from the cell to the head of a dewatering screen alongside. The screen is in two 3x9-ft parts and is clad with ½-mm wedge wire. It operates at 300 1½-in strokes per minute and is driven by a 5-hp motor.

From the end of the screen, the coal falls onto a 3-ft-wide porous belt woven of ¼-in plastic (polyvinyl-chloride) covered cord. Belt speed is 48 fpm. A spring-loaded roller above the head pulley squeezes out some tenaciously held water so that the product can be hoisted by an elevator with extremely shallow, almost flight-like buckets, discharging to a short horizontal belt conveyor for loading at the center of the car. The elevator and attached conveyor are made of light alloy so that the point of discharge can be arranged to suit local conditions.

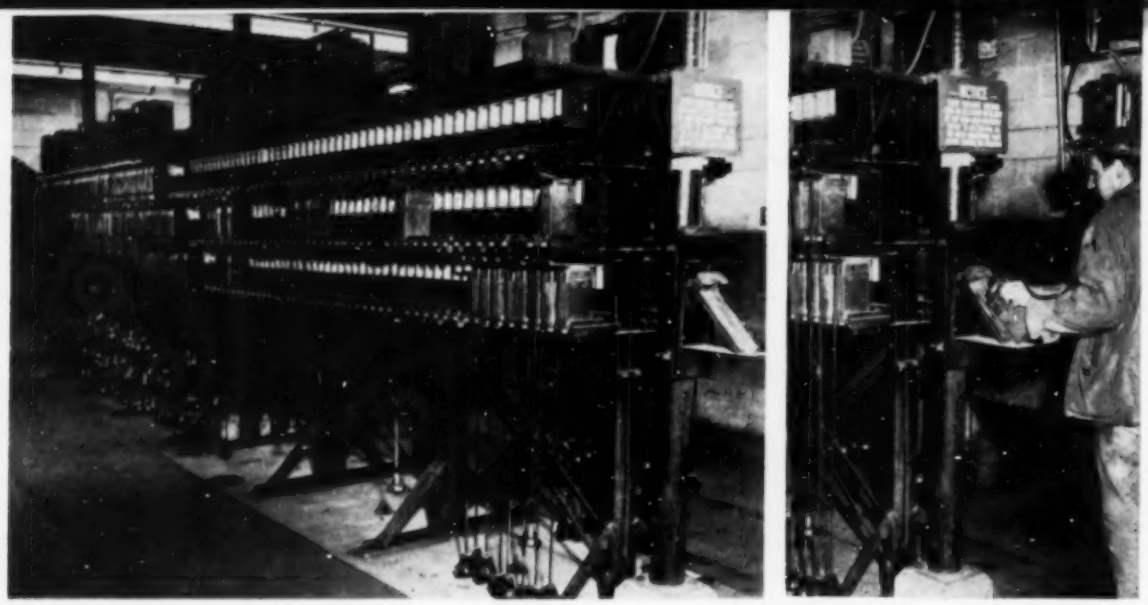
Underflows from the dewatering screen and porous belt are moved by a 3-in Wilfley pump into a 6-in cyclone. The spigot product, 50% solids, 43% minus 100-mesh, returns to the dewatering screen by gravity. The cyclone overflow, 10% solids, 82% minus 100-mesh, is extremely fine carbonaceous shale, and is run to refuse with the cell tailings.

Recovery of froth by this inexpensive system is 85% or better. Dewatered froth to the car is 4½ tph, 30% moisture, 32% minus 100-mesh. After standing for 36 hr in the car, the moisture drops to 10 to 12% as a result of the free-draining character of the clean-coal product.

PLANT MOVEMENT

Apart from the outlying repulping items, the equipment is contained in a simple steel and corrugated-sheet building with a floor area of about 400 sq ft. It can be broken down into 30 sections for movement with a minimum of effort, with no section exceeding 20x7½ ft in size nor 5½ short tons in weight.

The authors wish to express their thanks to the National Coal Board for permission to publish this article. The views expressed in it are those of the authors and not necessarily those of the board.



SELF-SERVICE LAMPHOUSE in change house speeds lamp distribution. Less than a minute is required for a miner to unlock his lamp and place it in its proper place for charging. Different colored tags with numbers provide fast easy identification for each shift. A magnetic lock opener (right) at the front end of the charging racks permits fast unlocking of lamps as men enter the change house.

Planned Lamp Handling

Three-shift operation at Dusquesne Light's Warwick mines requires smooth rapid movement of personnel. Here's how a self-service lamphouse and efficient handling of man-trips keep operations running smoothly.

MODERN TECHNIQUES and equipment for handling mine lamps plus efficient man-trip planning eliminate costly delays to personnel at the Warwick No. 1 and No. 2 mines of the Dusquesne Light Co., Greene County, Pennsylvania.

These two mines, operating three shifts per day, produce an average of 5,400 to 6,000 tpd. All this output is moved by barge down the Monongahela River to the company's power plants.

Man-trips exit from separate slope entries and unload at a single terminal, a few hundred feet from the change house. Prevention of costly delays to personnel between the change house and the working faces was achieved by a 15-min staggering of man-trip arrival time and by installation of a self-service system for the lamphouse.

With 611 Edison Model R-4 cap lamps in service daily, the lamphouse operation is considered vital to overall production by company officials. As explained by John Stephenson, superintendent at Warwick, "A total of 12 sections are being worked in both mines and we must have dependable miners' lamps and an effective distribution and maintenance program to prevent not only lost time for men and machinery but loss of production as well." Failures of R-4 lamps have been very rare, Mr. Stephenson said. No miner has had to leave his job to obtain another cap lamp since they have been in service.

Since the self-service lamphouse system was inaugurated at Warwick, lamp distribution has never bottlenecked personnel during shift changes. The charging racks and lamp maintenance room are located on the ground floor of the modern change house. It takes less than a minute for a miner to place his lamp in its proper place and be on his way to the showers.

A double row of charging racks arranged conveniently between the lamphouse door and the stairway to the shower room expedites movement of men through the lamproom. A magnetic lock opener is installed at the front end of the charging racks, near the entrance, to permit quick opening of the battery for charging as the men move by it to the racks. The on-coming shift moves along one side of the rack to pick up their lamps while the off-going shift replaces their lamps on the other side.

A minimum of maintenance is required for lamps at the Warwick operation. One lamphouse attendant is on duty for each shift and is assigned at all times to the same group used by his shift. One of the advantages of the self-service system is the time saved in over-all lamproom operations. Lamp men need to spend only about 3 hr of their shift time on lamp maintenance, including flame safety lamps, and devote the remainder to other duties around the change house.

By assigning one attendant on each shift to be responsible for the lamphouse, management feels that greater lamp-handling efficiency has resulted and production delays caused by lack of adequate illumination underground have been avoided. The cost of keeping this positive control over lamp charging and maintenance is negligible in comparison with the expense of lost time resulting from lamps not properly charged and maintained.

MAINTENANCE of lamps at Warwick requires only a few hours per shift, giving the lamphouse attendant the remaining time to handle other duties. Batteries are watered and cleaned once a week.

EMERGENCY PROTECTION against carbon monoxide is provided by strategically located cases of self-rescuers. Units are installed in recesses throughout the haulways (above) and others are carried in man-trip cars.

INCREASED EFFICIENCY and safety in over-all operation are the result of FM communication between locomotives, dispatcher, superintendent and shop. Scheduling trips at the two mines, as well as reporting machinery breakdowns has improved considerably since the units were installed. Extension microphones operating from a single set in the dispatcher's office, serve superintendent's office (right) and shop.

The lamp identification system used at Warwick consists of different colored checks which are placed by the men on a hook below the charging position of each lamp when the lamp is removed for use. Four colors have been adopted. White tags are used for the day general inside crew—cleanup men, ditchers, trackmen, etc. Blue tags identify the first shift; yellow the second; and red, the third. A separate rack is used by the supervisory personnel.

Routine watering of batteries is performed weekly by lamp men assigned to the individual shifts. A mimeographed sheet listing all lamp numbers is used to keep a record of the regular watering chore. Using a small dolly, a lamp man can remove 45 batteries from racks and water them at a rate of about one each minute. A small screw permits quick removal of the four pressure control valves so that adding distilled water to the cells is accomplished easily.

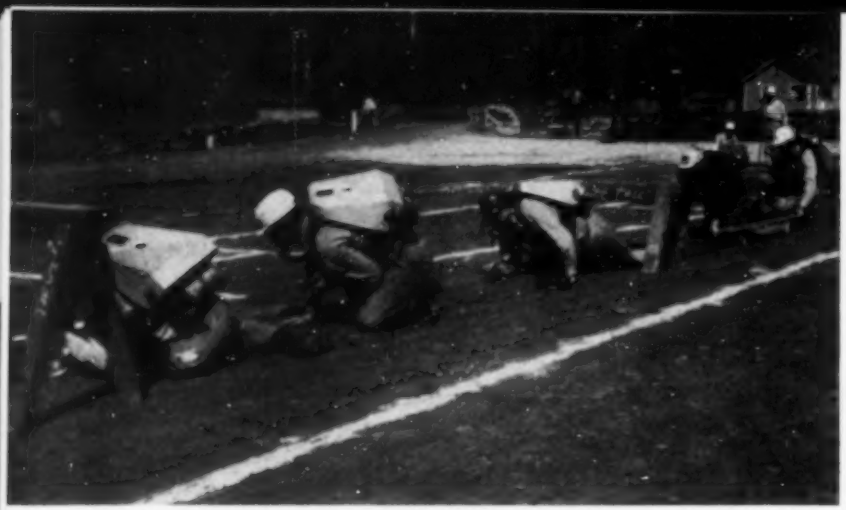
Among the more recent improvements at Warwick has been the installation of an MSA MinePhone system to serve the complicated workings of No. 1 mine. Use of the frequency-modulated instantaneous communication has been instrumental in coordinating trip movements from both mines as they move to a common car dump. One dispatcher handles all trip scheduling for both mines.

Strategically located around the mine are metal cases containing six MSA self rescuers for ready use in case of an emergency. Each case is placed in a recess cut into the haulageway rib and reinforced with concrete blocks. Location of each case is shown by a sign and red reflector light.

TRAINING . . . .

How to Tailor

By J. J. PLASKY
Training and Safety Director
Red Jacket Coal Corp.
Red Jacket, W. Va.



BASIC TRAINING in first aid, accident prevention and mine rescue reduces accidents and increases mining efficiency. Properly handled, such courses also can be used to stimulate interest in later training projects.

TRAINING CONFERENCES, such as this informal one on "Job Relations" in a mine office, are effective as well as the most popular with the men.

QUALIFIED INSTRUCTORS and material adapted to mining conditions are among the keys to success. Obtaining instructors is not a problem.

DO TRAINING PROGRAMS really pay their way? Is training an essential factor in present-day mine operation? Can it be fitted to the specific needs of your employees?

At Red Jacket, we have found from experience that management, operating officials and workers alike profit from the thought and effort put into a comprehensive training program. We believe that modern methods and equipment used in mining today put a premium on increased knowledge, new skills and changed habits and attitudes, and through organized programs we consistently seek to make such information and skills available to all employees, according to their needs and interests.

From experience, too, we have learned the factors involved in organizing and carrying out training successfully, at least at our properties. We have also discovered that while the need may not be apparent at first, once a training program has been begun, its effectiveness and need immediately become obvious and everyone concerned feels only an impatience to make progress on a very necessary and rewarding job.

Henry Ford once said, "You can take away all my wealth, all my plants, and just leave me my trained organization and I will soon have it all back." Your organization is just as important to you. Training can make it better, whether your company is large or small.

The Proof of Training . . .

Recently a mining company reported that at one of its mines an accident frequency rate of 98.5 per million man-hours in 1949 was lowered to 11.0 in 1950 and that for the company as a whole the 1949 rate of

Adapted from a paper presented at the Coal Mining Section, National Safety Congress, Oct. 19, 1953.

. . for Better Mine Operations

a Program to Your Needs and Make It Work

45.8 was dropped to 7.9 in 1952 (*Coal Age*, July, p 100). This excellent safety record, which the company credited to training, received national recognition. The training consisted of three or four courses which are available to all coal mining companies.

The U. S. Bureau of Mines reveals that 89% of accidents occurring in coal mines can be attributed to human failure. Such being the case, it is a logical conclusion that safety training is a major factor in any accident-prevention program. Safety training also increases efficiency, because the safe way is the most economical way. Therefore, we can count on training to perform the double role of decreasing accidents, and also, reducing the production cost of coal.

In spite of such evidence, the importance of a training program may have to be proved to a surprisingly large number of skeptical individuals. Consider the fact that coal operators themselves frequently ask, "Why do you have to train these men?" As far as the skeptics are concerned, the procedure seems unnecessary. However, once a training program has started, it is immediately obvious that the need is very great. Often it is difficult to determine where to begin.

Training involves not only the idea of receiving knowledge but that such knowledge be used through application, drill, and discipline. Many accidents occur not because of lack of knowledge, but rather because of lack of application of such knowledge.

The training program at Red Jacket may be no better than certain others in the industry, but this summary of our experience is presented in the hope that it will promote understanding of the actual benefits of training and may help others in organizing a training program.

Selling Management

Industrial education and training programs are adult education in perhaps its most effective form. At Red Jacket, we seek to bring about an orderly change in individual behavior by doing four things: (1) increase knowledge; (2) change attitudes; (3) develop new habits; and (4) teach new skills.

There is not a day passes but that some executive wishes that personnel of his organization had more knowledge about their job or the handling of men. In the supervisory field the lack of knowledge of safe procedures, handling men and other phases of the job may be especially costly. The mishandling of a situation or group of people, or only one person for that matter, may cost a life or a shutdown. After a completion of a course, "Psychology of Safety in Supervision," a foreman remarked that if he had had the knowledge learned in the course, he would not have been responsible for a 6-wk strike that was caused by mishandling people. The man and the company would have benefited considerably by any plan that would have broadened his knowledge of handling people. A program designed to increase the knowledge of the people in an organization is necessary and wholly justifiable.

The same pattern holds true for changing attitudes. An individual may have knowledge of his job and may handle people well, but if his attitude is contrary to that of his company, he may be a liability.

Developing new habits is a necessity because of the changes in the coal industry. The day of the "boss" is long past, and new habits must be developed by the new type of foreman now needed. All employees must develop and keep developing new habits to keep pace with the changes.

Teaching new skills is important because some developments, such as roof bolting, longwall mining, continuous mining, new methods of preparation and others, require the need of highly trained men, particularly at the mine foreman level. Years ago, a mine foreman did not hear such terms as compression zone, tension zone, initial arching limit, lateral pressures, etc. He is now learning about these terms. The successful use of some new methods of mining is dependent upon modern roof control. New skills also are required in labor and human relations. Therefore, teaching new skills fits into a training program.

More and more companies realize the importance of training and are doing something about it. Some have very elaborate programs under the direction of capable training personnel. All companies, large and small, can have training programs. Some may organize a program to fit their needs. Others may meet together at institutes and other such meetings. In southern West Virginia, the Coal Operators' Association aided considerably in starting a "Job Relations" program by printing and distributing various publications to all its member companies. The Bureau of Mines, as well as other agencies, is of great help in starting programs.

We know that untrained men in our mines are apt to cause an accident, that they are inefficient and do not fit into our organization. These men should be trained.

The broad objective of training is to attain the most effective use of manpower. In competition where resources, material and human, are available to all competitors, training becomes the controlling factor in the progress of a company. Training results in better informed and more courageous supervisors. It has been said that supervisors are in general as good, and in many cases, even better than management invites them to be.

As in most other businesses, training has become an integral part of our business. In line with the times, we have opened to supervisors and others such programs as first aid, mine rescue, accident prevention, general mining, mine foremanship, job relations, human relations, mechanical maintenance, lubrication, fire prevention, and others. Our conviction is that management has no right to be impatient with ignorance, but must eliminate it by making people aware of what they do not already know.

The policy of training at Red Jacket is outlined by a letter from the chairman of the board which states:

"It is recognized that the training of all employees, both to better fit them for their current positions and to qualify them for more responsible positions, is most vital. This training, naturally, divides itself into two basic parts, both of which require the fullest attention of all employees.

"The first is formal training in organized classes, taught by experienced and qualified instructors. The training department is responsible for this aspect and shall make available the maximum range of subjects with the

latest training aids and techniques.

"The second is informal on-the-job training and instruction, which is the direct responsibility of all classes of supervisors. This second phase is to have the fullest support, advice and assistance of the training department, with a view to broadening its range and increasing its effects."

Organizing a Program

Organizing a training program requires careful thought, planning and knowledge of local conditions, particularly pertaining to the type of mine and personnel. There are many successful training programs, but there is no assurance that any one program will be successful in any one field. In one instance, a course was very popular at one mine and nearly 100% of the eligible men attended. It was presented at another mine and shortly afterwards the men began to show their dissatisfaction and complained that they were not promoted fast enough.

The procedure in setting up a training program may be divided into four steps:

1. A study of various training programs and selection of one which seems best adapted to the particular need.

2. Conferences with educational directors of other programs, state colleges, government agencies, state department of mines, insurance companies and other groups, and listings of available services.

3. A selection of instructors from the various agencies or local plants to present the courses.

4. The arrangement of the sequence of courses comprising the programs and time of presentation.

Each step involves considerable detail. The first step should be the review of all available training programs. The various programs we studied were practical and successful in some locality, but knowledge of our conditions and personnel made it a foregone conclusion that some phases, if not all, of similar programs would be doomed to failure in our case. Therefore, it was necessary to select those parts of each program which, in our opinion, would be most successful.

Training programs studied included those used by General Motors, U. S. Government, U. S. Army, U. S. Bureau of Mines, various coal companies and other industries. The Metropolitan Insurance Co. has available a number of reports on training programs.

The conferences with training and educational directors of other companies and agencies were very beneficial because we learned from their experiences with trial and error techniques. Therefore, we would eliminate those difficulties in our program. In particular, we had the benefit of their advice and experience in methods of instruction. It was a pleasant surprise to find the many valuable services such as outlines, texts, films and, in some instances, instructors that are available from these sources.

The success of any training program depends in a large measure on the instructor. The instructors at our plants were drawn from the U. S. Bureau of Mines, West Virginia University, State College of West Virginia, Department of Mines, Kentucky Bureau of Economics, Esso Standard Oil Co., other agencies, and some from our local plants. No trouble was experienced in getting qualified instructors. At Red Jacket, there is no special group and every department head or other specialist is likely to be called on to help. The help may be in the form of program preparation or program presentation, and perhaps even both.

Many industrial concerns now are including a training service as part of their sales efforts, assigning competent instructors to teach various subjects. We have had, or will have, such men put on a series of special courses in preparation, lubrication, use, care and maintenance of electric cables, fire prevention, and others. These are courses for which industrial concerns have volunteered to furnish instructors and training aids. There is no lack of instructors and this phase of organizing a training program did not present any problem.

Selecting the course and time of presentation required the most consideration. While training can be made available to everyone, the danger lies in training merely for the sake of training. Since that kind of training rarely shows results, it represents a loss in both time and money. The selection of the course and timing the presentation are dependent primarily on the need.

It is fairly easy to determine that a department or section needs training. Safety and production may be below par and may indicate the need of training. However, to determine the specialized type of training needed requires a thorough study of the situation. Such a study may indicate the need of training in job methods, job planning, job instructions, human relations, or any one or more of several other phases. For instance, a supervisor may know mining methods, equipment and how to plan work, yet he may be lacking in certain leadership qualities which result in a bad accident record or inefficient operation. Training him in something he already knows will not improve the situation. The actual training need must be determined.

Several methods were employed at Red Jacket to determine needs. Surveys and talks with the management officials will generally determine the type of training needed. The big job is to get management men to admit they need help. Once the need is determined, training can be made available.

Presenting the Courses

At Red Jacket, a definite plan of courses was not established in advance, but rather each course paved the way for the next. Most of the men were dubious about the value of a training program at the beginning and it was necessary to build up interest. Generally, training started with a simple and familiar course such as first aid and mine rescue, and this course was expanded to lead the group into some other phase of training.

For example, suppose that management was having considerable difficulty in getting safety posts set and had decided that the supervisors were badly in need of training in human relations, which should be next on the agenda. Sometime during the first-aid course, or mine rescue for that matter, the instructor would begin to build up interest in a human-relations course. The problems in first aid would be worded in such a manner as to give the instructor a chance to point up the importance of human relations. For instance, a first-aid problem would describe an injury caused because safety posts were not set. The class would be led into a short discussion as to why men do not set safety posts and what it would take to get them to do so. The instructor by some well-placed questions can create enough interest that the men are eager to begin the next course.

The same method can be followed to create interest in any course. However, it is a step-by-step procedure and sometimes the wrong step is taken. In one case when a job-relations program was started, very little interest was shown in the course at the time. However, by following this step-by-step procedure and building up interest, the course was presented later and every supervisor and department head took it. Everyone liked it so much that they requested more along the same line. Such experiences prove the importance of timing the subject and giving it the necessary advance build-up.

Important Factors In a Training Program

A successful training program is developed after a determination of the need, a careful study of various programs and retention of the parts most likely to succeed, utilizing the advice and experience of several agencies, selecting qualified instructors, and selecting and timing the presentation. However, there are other factors that have a bearing on the success or failure of a training program, such as the interest and participation of management, and the terminology of the text of the actual courses.

Successful training programs were those presented in areas where training was needed. However, training kept at equal levels of supervision, starting at the top and going down, contributed much to the success of the course. Greater interest was shown by the group when all were on one level. The interest shown by top management permeated all the way down to the line supervisors, and even to the rank and file. Nothing contributes more to the success of a training program than to have top management interested and participating.

Another factor contributing to the success of a training program is phrasing courses in mining terminology. Many courses are available from different sources and the terms used must, of necessity, be general. Interest is difficult to maintain when material is presented in this form to a group of mining men. Therefore, any course presented at Red Jacket is changed to describe the situation or point in mining terms the class can understand. For example, in the text of a Job Relations course changes such as this were made:

"What are the common titles for the different levels of supervision in THIS SHOP?" The last two words were changed to read "THIS MINE." Such a change made a vast difference in the interest of the men.

The text in other courses was changed to familiar terms. For example, text for one discussion entitled "Why Do Accidents Happen?" originally read:

"1. A helper is repairing a bench, and his supervisor tells him to smooth up a piece of wood on the jointer. The fellow has watched men operate the machine and although he's never done it himself, he thinks he can. It looks easy. So he goes ahead. He puts his fingers over the edge of the piece and loses a couple of fingers.

"We know what happened here. His supervisor hadn't made sure the man knew how to use the jointer. He had not checked. Both had taken too much for granted."

This text was changed to read:

"1. A face man is working and the foreman calls him out and tells him to take the motor and get a part for the cutting machine which has broken down. The fellow has watched men operate the motor and although he has never done it himself he thinks he can. It looks easy so he goes ahead. The nip is on the wire and when he approaches it he fails to take it off and is dragged over the motor.

"We know what happened here. His supervisor handn't made sure the men knew how to operate the motor. He had not checked. Both had taken too much for granted."

In short, the description had to be revised if the interest of the men was to be aroused. Very few mining men are familiar with a jointer and it would be difficult to get the points across with this description. However, when a situation with which they were all familiar was described, it was fairly easy to get the points across. Terminology is most important in creating and maintaining interest in the courses.

The follow-up of any course also is important. On completion of a course, and after the men had time to try out the things they had learned, one or more sessions were held to get the men's reaction to the course and to re-emphasize the main points. Generally, this was done at a conference by means of a true-or-false quiz.

"Psychology of Safety in Supervision" is a very popular course. It is published by the National Safety Council and consists of six booklets with such subjects as "You Can't Change Human Nature," "What is your U.Q.?" "Teaching Safety on the Job," and others.

In presenting this course one booklet was given to each person and he was given about 1 wk to study it. Then he attended a conference at which he was required to answer a prepared true-or-false quiz with statements such as:

1. Human nature can be changed. T_____ F_____

2. Petty little things are important in supervision. T_____ F_____

3. Knowing how your men will react and perform is not a necessary factor of your leadership. T___ F___

These are some of the statements that created much discussion and pointed up the principles brought out in the booklets. It also taught the men how they could use the principles in their daily work. Follow-up of a course is important and very few, if any, booklets or pamphlets are issued at Red Jacket without such a follow-up.

Conferences Effective

The conference method of training was the most popular, and because it is flexible to meet many conditions it was used to a considerable extent. The versatility of this method is pointed up by an experience in trying to make the employees more safety conscious about accidents from falls of roof. Many supervisors were in the habit of telling the men to "Watch the Top." It was decided to ask the group if this was a proper remark for a supervisor to make. It required two sessions to settle this question.

Some supervisors thought the discussion unnecessary while others realized that the remark was an admission of inadequacy to cope with the situation and was merely passing the buck. The discussion finally ended when a participant stated that the Department of Mines, federal Bureau of Mines, many companies and states have laws and safety rules; that all require that some positive action be taken to adequately support or take down loose roof; but that the phrase, "Watch the Top," does not appear in any law or safety rule. No matter what the individual thought about this remark at the beginning of the session, the objective of the conference was achieved since the men discussed roof-fall accidents for several days and remembered the conference.

The conference method fits in well in human-relations courses. For example, a session was held to discuss the following situation:

A foreman, coming out at the end of the shift, remarks to his general foreman, "I got 100 cars today."

Courses of action.

(a) Ignore the statement.

(b) Just laugh.

(c) "Good work, John, but I'll bet you could get 115 if you wanted to."

(d) Say, "How about 110 tomorrow?"

(e) "Is that all!"

The group is asked which reply will encourage the operator, discourage him, cause him "to rest on his oars," and will it always apply.

A conference on such a situation can and does last 2 hr or more. Conferences are an important means of training and should be used where applicable.

In its simplest terms, the purpose of training is to instruct, to impart knowledge and discipline and, most of all, to make people think. It is obvious, therefore, that we can not afford not to have a training program.

"Roof Sewing" for Bad Top

Here's an idea for roof control that might be worth trying when you're faced with really difficult roof conditions. A Norwegian metal mine with conditions somewhat similar to coal mining has used this method for 7 yr without failure in areas where conventional roof bolts could not do the job.

By C. C. AUSTIN, Retired General Manager, Mancha Div., Goodman Mfg. Co.

DID YOU EVER HEAR of "sewing a mine roof in place"? Neither did I until I recently visited Norway.

At the A/S Sulitjelma Gruber mine, Sulitjelma, Norway, two variations of the method, both the same in principle, are used where the top is particularly dangerous and the conventional roof bolt is not sufficient. The roof is hung on wire rope, grouted into place and run from hole to hole. The rope hangs below the roof between the holes and its appearance is not unlike loose stitches of thread. As a result, the miners call it "sewing the roof."

Actually, the rope between the holes has no purpose. It is just not worth the cost of cutting it. Success of the method, which has been used for about 7 yr without failures, is attributed to the fact that loose rock is cemented into one solid block that is suspended from the overlaying solid rock by the wire-rope loops in the drill holes. According to Einar Tröften, chief mining engineer for the company and originator of the method, the depth of the holes and the distance between them are not based on any mathematical formulas but are rather the result of experience. Some mathematical investigations now are being made, he reports.

The ore at the Sulitjelma property is 3 ft 4 in to 6 ft 8 in thick, roughly horizontal on the strike 1,300 to 2,000 ft wide with a dip of 10 to 50 deg and lies under a laminated schist top. The part of the vein dipping 10 to 35 deg is mined by scrapers working on a long face that closely resembles longwall coal mining. Both cribbed pillars of schist blocks and conventional split-end roof bolts with wedges are used to support the top. This method has been employed for 20 yr in various places and now is being used in the stopes.

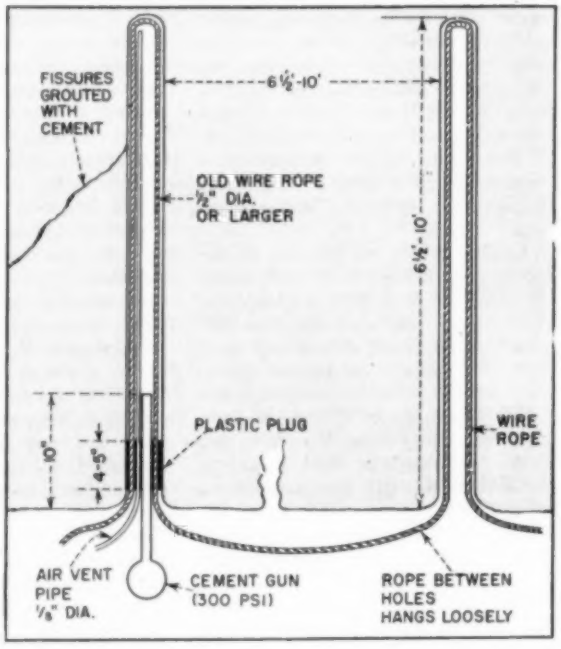
Sewing the roof, as shown in the accompanying drawing, is a six-step process as follows:

1. Drill holes of the appropriate diameter 6½ to 10 ft into the roof. Diameter can be as small as 1¼ in at the top when ½-in rope is used.

2. Push the loop of wire rope to the top of the hole, then extend the rope to the next hole 6½ to 10 ft away and insert the wire-rope loop there. This may be repeated indefinitely as desired. At Sulitjelma Gruber, old ½-in rope is used.

3. Insert a ⅛-in air-vent pipe to the top of the hole.

4. Place a ¾-in pipe about 10 in long, with a grouting-gun connection, in the hole. With a small hole, it may be necessary to increase the diameter at the bottom to accommodate this pipe as well as the bleeder pipe and wire rope.

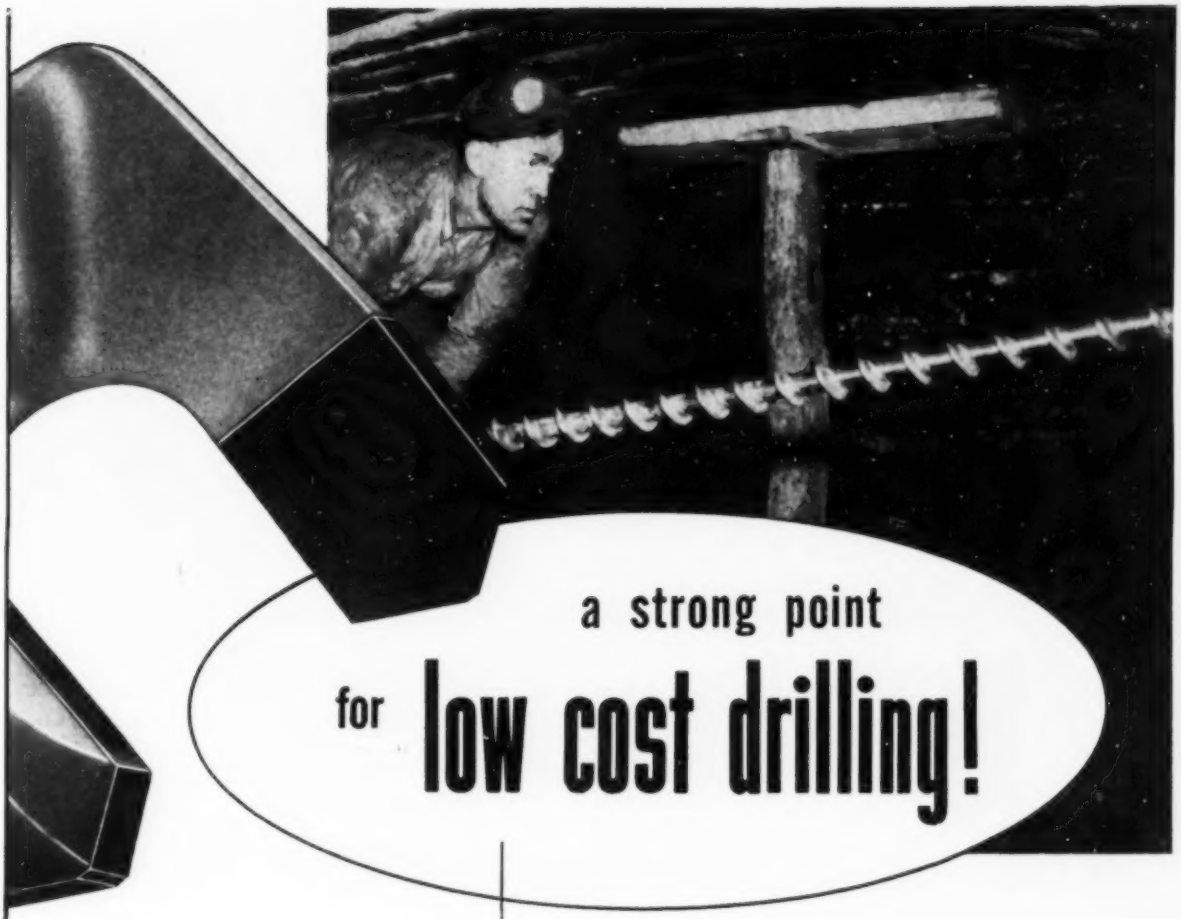


5. Push a solid plug of "Silex" plastic about 4 to 5 in into the hole, around the outside of ⅛-in vent pipe, the ¾-in grouting pipe and the two strands of wire rope. Sold in Norway by Ingenir Harold Henschien & Co., Oslo, the Silex hardens in a few minutes and will stand the grouting-gun pressure of about 300 psi.

6. Pump cement grout into the drill hole and all the cracks and fissures cut by the drill hole, using a hand pump.

Air is ejected through the air-vent pipe as the cement grout rises in the hole and eventually fills it. When cement can no longer be forced into the hole, the installation is completed. Early attempts at installation were not successful because no provision was made for venting the air. Once this was done, however, the method proved to be a complete success.

Adapted from an article in *Engineering and Mining Journal* entitled "Roof Sewing."



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Foremen's Forum

FROM THE FLOOR OF THE STOCK EXCHANGE to the face of a coal mine may seem like an unbridgable chasm. There is a close link, however, since each derives some of its success from the other and both contribute to progress in industry and a rising standard of living.

What Is a Stockholder? . . . What Does He Mean to You?

Investors in American industry are optimists who back up their confidence with hard money. They did not merely hire you—they consider you an expert who can be trusted to do a good job with that money.

PERIODICALLY we move out of the mines to discuss the mine supervisor's place in the larger scheme of things. In this endeavor, we have at various times talked about the supervisor's responsibilities in his community, his role as a teacher, his position and functions within the company organization and other allied subjects. This month we have another opportunity to take a look at the "Big Picture," since the 10-p report on cost cutting in this issue will suffice in providing food for on-the-job digestion. We invite your attention to it (pp 70-79).

Leaving the face, then, let's think about the mine supervisor's relationship with stockholders and vice versa. Is there a common interest between the two groups? Or are they really far apart?

Getting down to the meaty questions, what is a stockholder? How complicated are his operations? Of what earthly value is he? Is he the parasite some cloud-brained folks would have us think he is?

A stockholder is somebody who owns part of a company or a business. The money with which that person bought his piece of the business is used by the company's management to buy machines and equipment to start the company or to help it grow.

For any company, there may be anywhere from two or three or half a dozen to hundreds of thousands of stockholders. To some extent, the number of stockholders depends on the size of the company and the amount of money tied up in the business.

Anybody who owns as much as one share of stock in a business is a capitalist. That means that anybody who saves up a little money can become a capitalist. Lots of people do. Businessmen often own stock in the companies they are associated with; sometimes, in other companies as well. Some housewives who have saved a little out of their housekeeping money have invested their savings in stocks. Many working people, like steel-workers, telephone operators, nurses, electricians, store clerks and bookkeepers have put part or all of their savings into stocks. Even insurance companies and colleges buy stocks with part of their reserve funds. All stockholders use their money this way in the hope of making a little extra money with their savings.

Suppose you get hold of a little extra money somehow and decide to put it to work for you. In other words, suppose you decided to become a stockholder.

How can you buy some stock for yourself?

If the company you decide to buy stock in is a small company, you may be able to buy a share or several shares simply by seeking out somebody who already owns stock and offering to buy some of his. If he's willing to sell and if you and he can agree on a price, you'll

give him the money and he'll transfer the stock certificate to you.

If the company you decide to buy stock in is a big outfit, shares of which are traded openly on some exchange, you'll have to get a member of the exchange, called a broker, to buy your stock for you. He'll help you find out what's a fair price to offer for the stock and, acting in your behalf, he'll buy it for you at the best price possible and turn the stock certificates over to you. Buying stock for people like you is the broker's business and he charges a reasonable fee for his services. That's the way he makes his living—by bringing buyer and seller together.

Why would anybody want to buy stock in a company?

People buy stock in a company because, as explained above, they have a little money above their day-to-day needs and want to put it to work for them. By buying stock, they put their money in the hands of specialists who know how to make money work in the particular business the stockholder invests in. Those specialists are the officers and management of the company.

Maybe you decide to invest in a coal company, for example, and you buy a share of stock for $25, say. You don't have to know anything about the coal-mining business to own that share of stock. But that share of stock entitles you to attend stockholders's meetings and help elect officers and management men—the specialists—who do know how to run a coal business.

What do the officers and management do with the $25 you paid for your share of stock? They pool it together with the money of other stockholders and use it to buy new machines, new preparation plants and new coal lands to replace worked-out mines—all with the hope that with skilled management and good workers, the company will stay in business, grow and make a profit. You, as a stockholder, hope to share in that profit.

When you own stock, nobody guarantees you anything. That's how owning stock differs from putting your money in a savings bank.

The president of a savings bank, like the officers and management of a coal company, is a specialist in making money work. But he works differently. You don't buy a share of anything when you put your money with him for safekeeping, and you don't become part owner of the bank. The bank lends out your money to people who are building a home, for example. They pay him 6c or so per year for the use of every dollar the bank president lends them. The banker, in turn, promises to pay you 2c or 3c out of that 6c and uses the remaining 3c or 4c for his business expenses (secretary, bookkeeper, rent, lights, telephone, etc.) and for his own salary. He manages your money under state and federal laws that are carefully framed to protect your money and assure you of a return on your savings. The president and his bank take all the risks of the banking business. You take none of the risks.

Thoughts for the Day . . .

• To be born a gentleman is an accident, but to die one is an achievement.

• The real measure of our wealth is how much we would be worth if we lost our money.

• We seldom lose our religion by a blowout; usually it is just a slow leak.

• A determined soul will do more with a rusty monkey wrench than a loafer will accomplish with all the tools in a machine shop.

• The best way to preserve democracy—is to deserve it.

• A clever mind sees another person's problem—but it takes an understanding heart to solve it.

• It seems easier to spend money than to spend more of ourselves.

• No man can become a failure without his own consent.

• When you become dissatisfied with yourself instead of your job, you will go places.

• The smallest good deed is better than the grandest intention.

But if you're a stockholder in a coal company—or any other kind of company—you do take risks along with the other stockholders. If the company does well and has a tidy sum left over after paying all its bills, you and the other stockholders get a share of the profits at the end of the year.

Suppose the profits, when divided up, came out at $1.75 per share of stock. That would be a 7% dividend on your $25 investment. That's a pretty good rate of return—better than most. If your share of stock earned that much, other people, hearing about your good investment, then would want to buy your share of stock. They might offer you as much as $35 for it. You could sell it or hold onto it, whichever way you thought you'd make the most money. If you sold it, you'd have your original $25, plus the $10 increase in the value of your share, plus the $1.75 dividend. In short, you'd have earned 47% on your original investment instead of 2 or 3%, as in a savings bank. If you decided not to sell, you'd keep on getting whatever dividends the company might pay as long as you kept the stock.

But maybe the company runs into a slow year and makes little or no profit. If that happens, chances are you won't get a dividend unless the company can pay dividends out of profits set aside in earlier years. In those circumstances, the value of your share of stock is likely to drop—from $25 down to, say, $10. In other words, the value of your stock depends on the company's ability to pay dividends and if people see no chance for dividends they won't offer you a good price for your share.

Those are the risks you take when you're a stockholder. The payoff, when it comes, is likely to be good. On the other hand, there may be no payoff at all.

But the people who have been willing to take that kind of risk through the years are the people who have built American industry. Together, they have provided the capital to build our railroads and our airlines, our oil refineries and our coal mines, our steel mills and our textile plants. It's been free, risk-taking, capitalistic enterprise all the way. And, in the long run, the American people have got a lot more out than they've put in. The risks have paid off and, unless something goes badly wrong, they'll keep on paying off in the years ahead.

The whole point is this: Stockholders are necessary for America's progress because they provide the capital needed for industrial growth. Without them, the coal industry today wouldn't be a modern, mechanized industry.

Well, we think that's a fair picture of the main body of stockholders. They are optimists who are willing to back their confidence with money.

Where does the mine supervisor fit into the picture? He is a representative of management. He is a member of the team of experts which the stockholders trust with their money, since they have little knowledge of mining themselves. That places a heavy responsibility on the supervisor. As a member of the team of experts, he will have a voice in how some of these funds are spent.

Wise use of the money invested by the stockholders leads to a healthy company. The proper amounts of the total investment will be spent for mine operations, sales, advertising and other necessary functions. And if all goes well, there will be a profit, some of which the stockholders may divide.

Now, the $64 question: Why should you "bust" your neck to make money for somebody's you never knew? In answering, we'll bring up a human characteristic known as enlightened self-interest. By conducting affairs at the mine in a manner that will permit the payment of stock dividends, you will be making your own job more stable and secure. Here's an example of how that might work.

The fact that your company is able to pay dividends will be recognized by the investing public as a sign of corporate health. Your team of experts is doing a good job. Now suppose your company wants to expand, but a lot of money is required to do it. It can get the necessary money by making the proper arrangements to issue more stock for sale, and the investing public, aware of the health of your company through its record of dividend payment, will purchase the stock. This new capital, gained through the sale of the stock, may be used to finance your company's expansion. As your company grows and makes progress, your job becomes more secure.

So the mine supervisor and the stockholder have much in common. Their co-operation spells progress.

JENKINS PRACTICAL PIPING LAYOUTS 70

How to plan an INDUSTRIAL WASTE TREATMENT SYSTEM

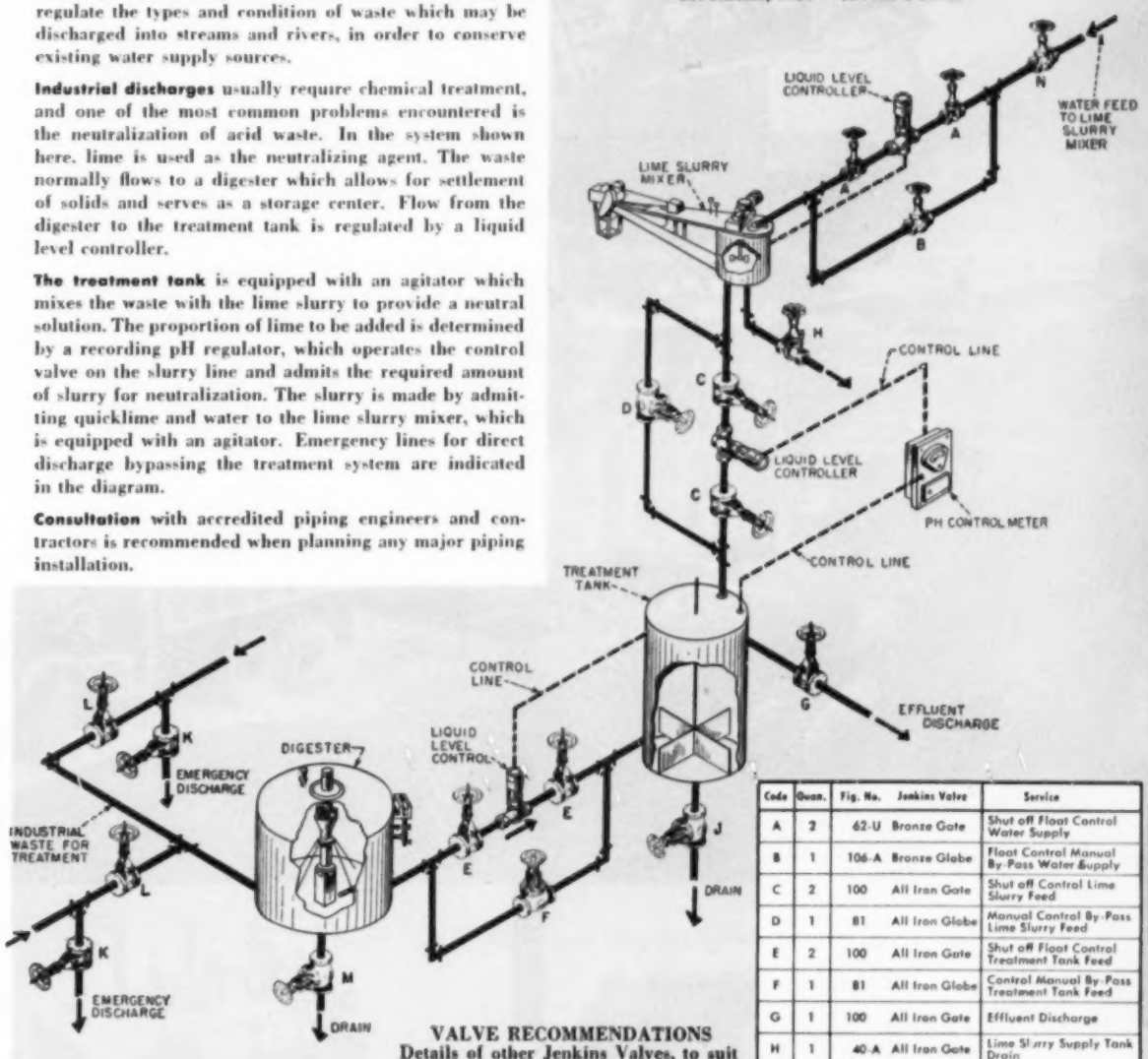
In many areas, stringent codes have been drawn up to regulate the types and condition of waste which may be discharged into streams and rivers, in order to conserve existing water supply sources.

Industrial discharges usually require chemical treatment, and one of the most common problems encountered is the neutralization of acid waste. In the system shown here, lime is used as the neutralizing agent. The waste normally flows to a digester which allows for settlement of solids and serves as a storage center. Flow from the digester to the treatment tank is regulated by a liquid level controller.

The treatment tank is equipped with an agitator which mixes the waste with the lime slurry to provide a neutral solution. The proportion of lime to be added is determined by a recording pH regulator, which operates the control valve on the slurry line and admits the required amount of slurry for neutralization. The slurry is made by admitting quicklime and water to the lime slurry mixer, which is equipped with an agitator. Emergency lines for direct discharge bypassing the treatment system are indicated in the diagram.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

Diagram by Huxley Madeheim, Consulting Engineer



VALVE RECOMMENDATIONS
Details of other Jenkins Valves, to suit varying conditions, available on request.

Code	Quan.	Fig. No.	Jenkins Valve	Service
A	2	62-U	Bronze Gate	Shut off Float Control Water Supply
B	1	106-A	Bronze Globe	Float Control Manual By-Pass Water Supply
C	2	100	All Iron Gate	Shut off Control Lime Slurry Feed
D	1	81	All Iron Globe	Manual Control By-Pass Lime Slurry Feed
E	2	100	All Iron Gate	Shut off Float Control Treatment Tank Feed
F	1	81	All Iron Globe	Control Manual By-Pass Treatment Tank Feed
G	1	100	All Iron Gate	Effluent Discharge
H	1	40-A	All Iron Gate	Lime Slurry Supply Tank Drain
J	1	81	All Iron Gate	Treatment Tank Drain
K	4	100	All Iron Gate	Emergency Waste Discharge
L	4	100	All Iron Gate	Shut off Waste Lines
M	1	81	All Iron Globe	Digester Drain

To simplify planning, to save time, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 70.

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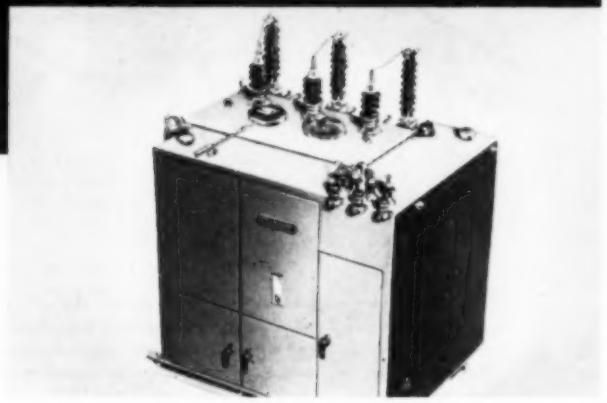

Rototrol is the master intelligence governing shovel and dragline operations. It gives a quick, smooth response to your operator's slightest control movement. This fast action cuts operating cycle time and speeds up production.

Westinghouse CSP transformer substations combine lightning, overload and short-circuit protection with voltage regulation, load switching and low-voltage metering in one compact unit. They come pre-tested and ready for work.

Here's equipment for outstripping records

Over 1.5 million cubic yards of overburden stripped in one month by one stripping shovel! That's the new world's record set recently by a Westinghouse-equipped shovel at an Ohio coal mine. Elsewhere, many other companies, using Westinghouse operating and power distribution apparatus, have topped their old performance figures. Perhaps this Westinghouse combination could help you shoot for a few records, too.

Shovel equipment is fast and dependable

All Westinghouse shovel motors, generators and controls are specially built to give you a fast swing cycle and durability. Take Rototrol® control for example. It's the "brain" of superior shovel and dragline performance. It gives your operator an instantaneous response to his master switch. Rototrol can take years of rigorous service without varying its accurate operation. Yet it's so simply designed that your own men can service it easily in the field.

Substations give you protection and flexibility

Westinghouse CSP® transformer substations are ideal for open pit and strip mines. They're completely self-protecting. They contain all of the necessary electrical equipment in one compact, factory coordinated unit. All you have to do is put them in place and hook them up. If you change your base of operations, you can skid them easily to a new location.

Portable switchhouses facilitate fast hookups

Westinghouse switchhouses provide the connecting link between operating equipment and your substation. They give you circuit, overload and ground protection. Each is built to handle one or more outgoing feeder cables. Westinghouse portable switchhouses are skid-mounted to simplify moving.

It will pay you to call Westinghouse

When you deal with Westinghouse, you have one reliable source for all of your electrical needs. Also, Westinghouse engineers will help you determine the best type of apparatus for your operation. They can also assist you in coordinating this equipment to do the best job. Plan a more profitable operation today by calling your Westinghouse representative.

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This Westinghouse skid-mounted, portable switchhouse can handle three outgoing feeder cables. It contains an oil circuit breaker, disconnect switches, overload, ground protective equipment and plug-type receptacles.

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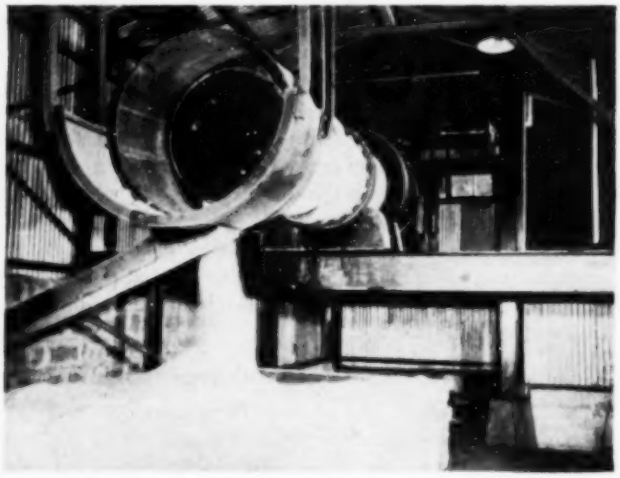
Operating Ideas



PLANNED for low-cost sand handling, Itmann sand house includes (left to right) section housing kiln and dry-sand loading track, elevated 100-ton bin, depressed dump hopper, coal furnace and fuel bin. High-capacity rotary kiln (right) drops dried sand directly into mine car and discharges screened-out refuse to a chute leading to the side of the car.

Kiln-Type Drier Cuts Cost of Dried Sand

OUTSIDE EQUIPMENT at the new Itmann colliery of the Pocahontas Fuel Co., Inc., Itmann, W. Va., includes a sand-drying installation using a rotary kiln to provide high capacity so as to reduce attendance labor. It dries 20 tons in a shift and, with the mine now hauling its full capacity of 11,000 tons of raw material per 2-shift day with locomotives, the drier needs to be fired up only about 2 shifts per week to handle sand requirements at the property.

The building is within 50 ft of the lamphouse so that the attendant of that facility can conveniently look after the sand drying also.

End-dump trucks delivering the raw sand discharge to a sunken 8-ton hopper from which the sand is elevated to a 100-ton bin over the feeder to the rotary kiln. The discharge end of the kiln includes a screen section through which the dried sand drops directly into mine cars. The screen passes the trash or oversize to a chute leading to the outside. The kiln has a 30-in outside diameter and is 25 ft long, including the 18-in screen section.

The hand-fired coal furnace, equipped with rocking grates, is the outdoor type and is installed separately from the building. Flue gases are conducted through a horizontal steel-supported tile and brick flue.

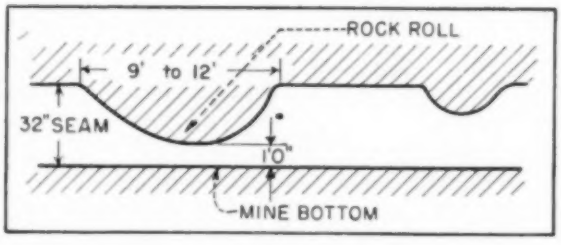
The sand house, located some distance from the mine portal, is connected to it by a side track terminating under the rotary kiln that accommodates the loading of two mine cars.

Rotary Drilling Reduces Cost of Removing Rock Rolls

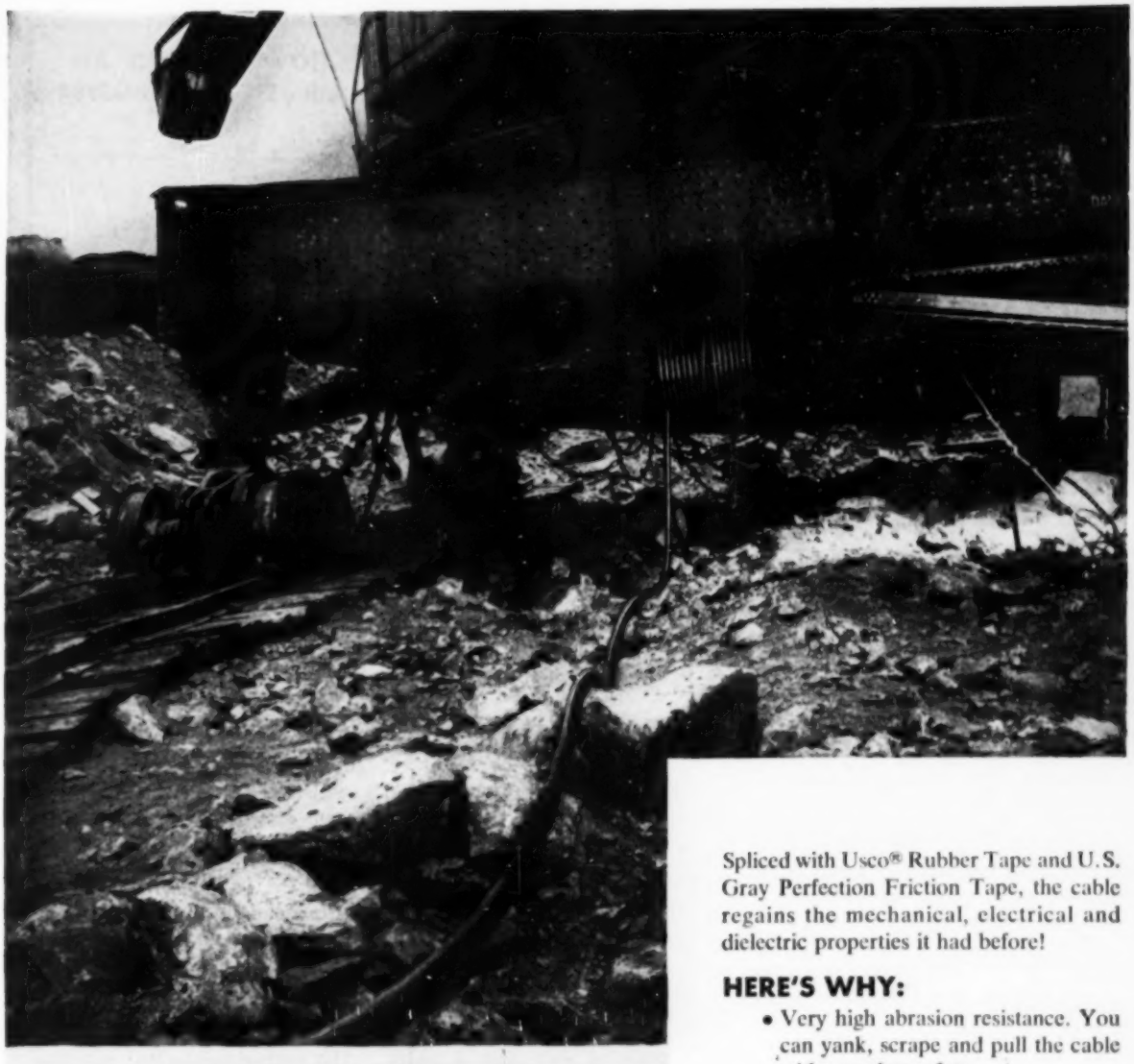
REMOVAL OF SEVERE ROCK ROLLS consisting of hard slate rock with laminations and nodules of sandstone has been accomplished with rotary drills and carbide bits at substantial savings in both time and money at the Timtony mine of the Left Fork Fuel Co., Inc., Greenbrier County, West Virginia.

With this equipment, holes are drilled quickly, economical bit footage obtained, and over a period of 1 yr no drill maintenance has been required, according to reports. The rolls causing this problem are 9 to 12 ft long in many instances and pinched to within 1 ft of the bottom (see drawing). They occur as frequently as one per shift. To remove them, holes 2 ft long are drilled at approximately one-third the roll depth from the mine roof. The holes are angled to the roof and spaced across the entry according to the roll's size and hardness. In this manner, the rolls are benched off and the rock removed.

At first, it was believed that pneumatic equipment was the only practical solution to these conditions, and that presented the problem of moving a compressor and related equipment over pan lines and belts in the 32-in Sewell seam. A trial



of Kennametal Style RDC 1⅞-in bits, AL-14 2-ft augers 1½ in in diameter and a Chicago Pneumatic 572 drill, however, quickly proved their adaptability for this service, with penetration rates of as high as 1 fpm. Since this experience, many other difficult rock-drilling problems in the mine, most important of which is drilling rock for loading-head clearance, have been successfully handled with these rotary tools.



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Economical Rock-Duster Permits Bolting Crew to Rock-Dust in Face Cycle

LIGHTWEIGHT JET ROCK-DUSTER permitting bolting crew to use drill compressor to rock-dust in the face cycle is shown by J. E. Jones, Federal mine inspector, who originated the idea. Dense cloud of rock dust blown from discharge end of hose (right) illustrates effectiveness of the unit.

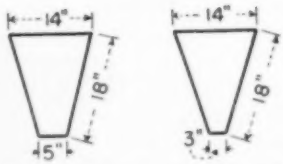
ECONOMICAL ROCK-DUSTING on cycle by a roof-bolting crew using air drills is being done successfully with a new air-jet rock-duster in the Hazard field of Kentucky. The duster consists of a small hopper fitted with a jet and nozzle and is light enough so that one man can carry it. Total cost of the unit was about $25.

The idea for the air-jet rock-duster was conceived by John E. Jones, a federal mine inspector in the Hazard field, and it became a reality through co-operation with Robert Dickson, safety director, Hazard Coal Operators' Association, who has supplied these details. The first unit was made and put in use at the Leatherwood mine of the Blue Diamond Coal Co. Since that time many other units have been made and put in service in the Hazard field and some have been sent to other operations in other fields.

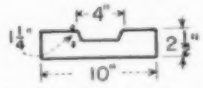
Simplicity of construction with no moving parts is the outstanding feature of the new duster. The unit consists of an air jet properly installed in a piece of 2½-in pipe which had a 4-in section removed from the top and a sheet-metal hopper welded in place of it. The jet was made from a piece of ¾-in pipe reduced to a ⅜-in opening at one end and threaded 8 in at the other. Regulation of the rate of dispension of rock dust is controlled by screwing pipe in and out.

To rock-dust a place, the stoper air hose is disconnected from the drill and temporarily connected to the ¾-in pipe of the hopper, the air turned on, a bag of rock dust is broken open and placed in the hopper. A bag of dust is distributed in about 1 min.

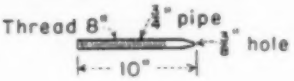
HOW TO MAKE AN AIR-JET ROCK-DUSTER



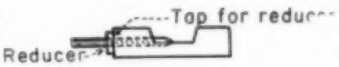
1. Cut two pieces of each size and weld together to make hopper with 3x5-in opening.



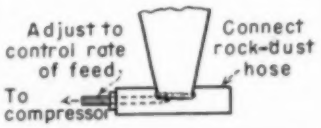
2. Cut slot in pipe.



3. Make jet.



4. Fit jet in pipe.



5. Weld hopper to opening in pipe and add base or legs.

This method insures that rock-dusting is kept up to the face and it effects a great saving since a rock-dusting crew need not be sent into the mine on an off-shift.

For further information about the rock duster, Mr. Dickson suggests that readers send their inquiries to the Kentucky River Mining Institute, Hazard, Ky.

Reminder—Cold Weather Increases Mine Hazards

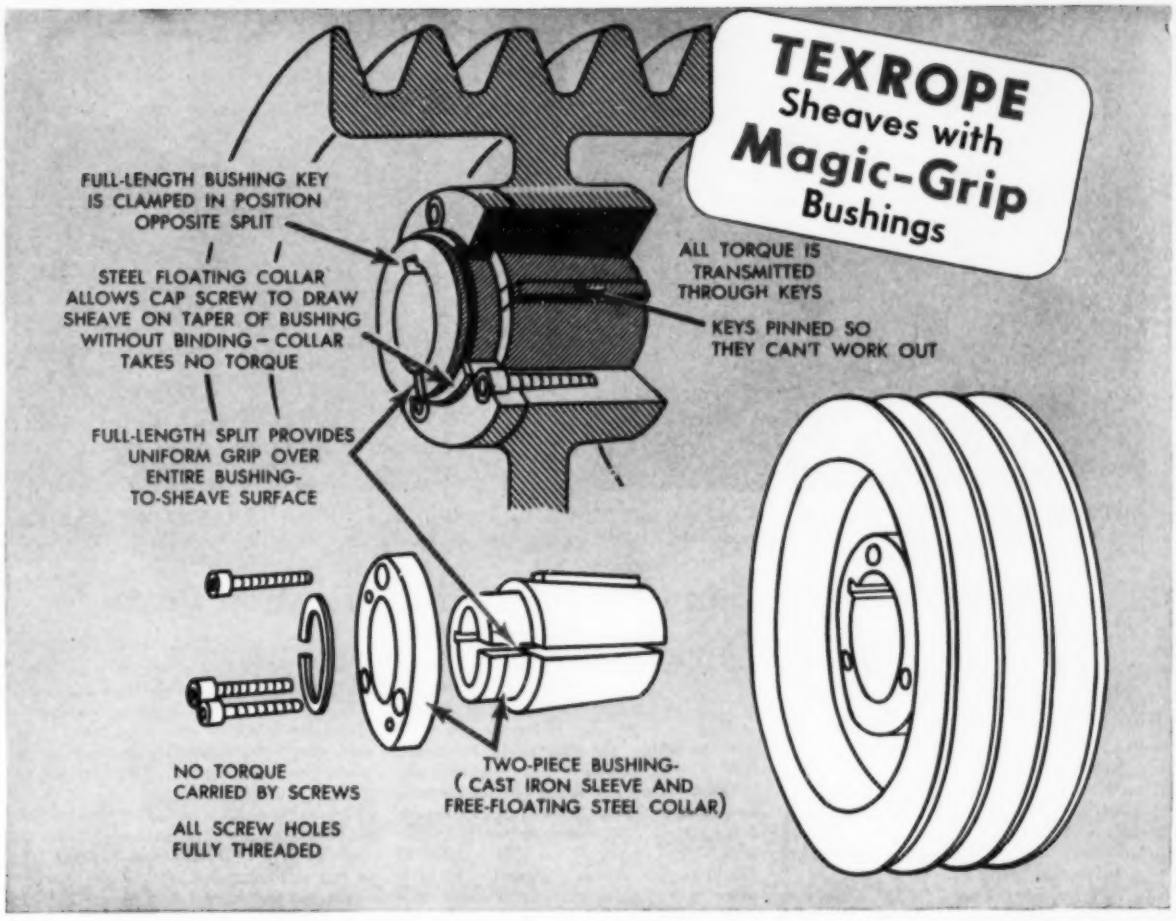
POINTING OUT that nearly two-thirds of all fire and explosions disasters during the past 48 yr occurred during the 6 mo from October to March, the USBM last month urged all coal mine operators and workers to take precautions necessary to minimize these hazards that will increase with the coming of winter. During winter, cool dry air entering a mine picks up moisture from the mine surfaces and dries out mine dusts. "Dry bituminous coal dust," said J. J. Forbes, USBM director, "is as explosive and 'touchy' as black powder under certain conditions and, of course, it ignites easily." Winter precautions urged by the Bureau include:

1. Loose coal and coal dust should not be permitted to accumulate in active workings, and adequate amounts of rock dust should be applied to the roof, ribs and floor of such workings.

2. Mines should be properly ventilated to prevent explosive gas accumulating in active workings, and frequent examinations for gas accumulations should be made.

3. Electrical equipment and cables should be carefully installed and maintained to guard against overheating, and adequate, suitable fire-fighting equipment should be provided at places where it can be obtained quickly in an emergency.

4. Federal and state mining laws and company safety regulations should be strictly complied with.



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All screws engage full thread.	Yes	Yes	Yes	No
Mounts in one piece.	Yes	No	Yes	Yes
Squares itself with shaft.	Yes	No	No	No

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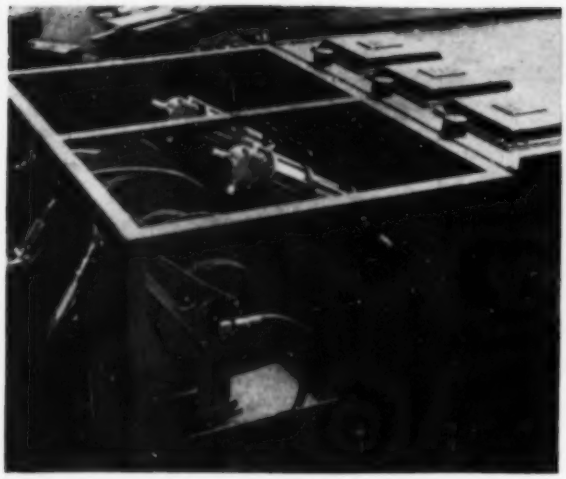

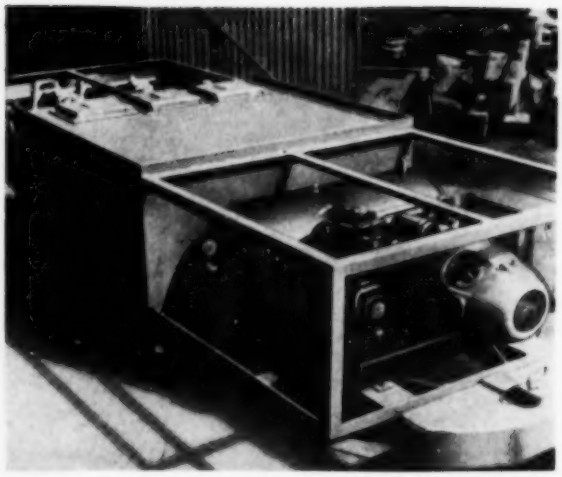

AUTOMATIC-RETRACTING REELS on wheel-mounted unit handle grease hoses leading from high-pressure pumps (left photo). Air for grease guns is supplied by compressor mounted at rear of truck (right).

Portable Truck Cuts Underground Lubrication Costs

ONE OF THE MOST MODERN and unusual methods of lubricating loading machines, mine cars and other underground machinery is in use at the Perry Coal Co., O'Fallon, Ill., Div. of the Midwest Radiant Coal Co.

Seeking a more efficient and safer method to lubricate underground machinery, J. Johnson, mine superintendent, developed the design of the "Mine Lubrovan" in co-operation with his maintenance crew.

Basic construction of the Lubrovan was done by Mr. Johnson's maintenance personnel. The installation of the actual lubrication equipment was supervised by engineers of the Jos. H. Yerkes & Co., St. Louis, Mo., distributors for the Lincoln Engineering Co., also of St. Louis.

There are many interesting features incorporated in this new Lubrovan, believed to be the only one of its kind in existence. The unit is of all-steel construction, mounted on conventional mine-car wheels, and is only 43½ in high overall from top of track to top of cabinet—an important advantage in underground service. A 14-cu ft air compressor with heavy duty DC motor is mounted at the rear of the Lubrovan adjacent to a cabinet for tools and special equipment.

Ahead of the cabinet are three built-in steel tanks for high-pressure grease, hydraulic fluid and oil. Two heavy duty Lincoln air-motor-operated lubricant pumps, 4-in-diameter piston, are arranged at approximately a 30-deg angle, with the pump tubes extending through ports into the grease and oil reservoirs. The pump for high-pressure delivery of grease has a ratio of 40:1; the low-pressure pump for oil, 6:1. Pumps are connected by short hose lines to spring-actuated automatic-retracting reels.

The high- and low-pressure reels, each holding 50 ft of delivery hose equipped with high-pressure control valve and low-pressure shut-off valve, respectively, are mounted at the extreme front of the Lubrovan for easy access. A third reel holding 50 ft of air hose is mounted adjacent to the lubricant hose reels. The air hose is equipped with a blow gun for use in blowing dust off fittings before adding fresh grease. A fourth reel with hose assembly for dispensing hydraulic fluid is to be added to the present bank.

With tools, special service equipment, and complete power-operated lubrication facilities all centralized in one portable unit, time required for lubrication of machinery is greatly reduced. Two or more maintenance men can work on machinery simultaneously. All the inherent disadvantages of obsolete "hand lubrication" methods, using grease guns and oil cans, are eliminated. No longer is it necessary for a mechanic to crawl over machinery with a hand gun that is difficult to operate in close quarters.

Time also is saved by not having to stop and refill hand guns and oil cans. Positive lubrication of bearing points is assured by the power-operated lube equipment. Application of the right lubricant is guaranteed by elimination of the danger of filling a grease gun with the wrong lubricant or using a gun filled with lubricant designed for another application. By more accurate control, provided by lubricant under uniform pressure dispensed through valves, lubricant waste has been slashed. Bearings are no longer flooded or starved and as a result, bearing life on all machines has been extended, with a proportionate reduction in down time for repairs and cost of replacement parts.

Lubrication at the Perry Coal Co. is a precision operation. Each day, at the end of the first shift, the Lubrovan is rolled into the mine, machinery is quickly and thoroughly lubricated, following a set routine. With the job done, the unit is then quickly removed from the mine, permitting immediate resumption of work. In addition, the versatile unit can be readily moved to the maintenance shop to lubricate repaired or rebuilt machinery, or taken elsewhere on the property to service various types of surface equipment.

Tire-Mounted Board An Insulating Mat

AT THE PACEMAKER MINE of the Congleton Bros. Coal Co., Beattyville, Ky., the rubber mats used in front of the 275-v open-type switchboard of the diesel-generating set had a habit of disappearing. They were made from conveyor belting and apparently truckers appropriated them for making mud guards. As a result, inspectors sometimes reported the switchboard without an insulating mat.

Finally, a scheme was hit on to remedy the situation once and for all. A plank, 2 x 12 x 30 in, was bolted to one sidewall of a scrapped truck tire. This insulated platform has never strayed since.

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WHEN you buy a piece of Cat* equipment, you think of a lot of other things besides tough steel and yellow paint. Things you can't see or feel or touch, but that will help you make *more money this year—and year after year!*

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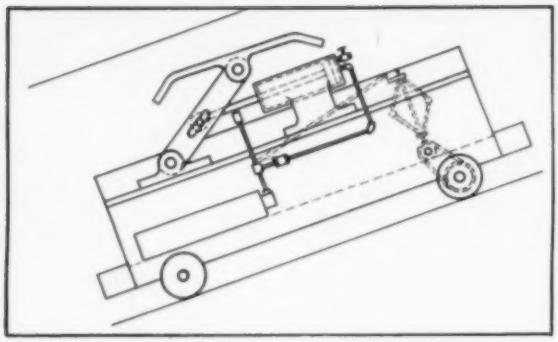
EARTHMOVING EQUIPMENT

Special Supply-Trip Car Combines Safety and Utility

A SPECIAL MAN-CAR coupled between the motor and the first car of timber rails in supply trips combines safety and utility at the Piney Fork mine, Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co. The new car, designed and built in the company shop by Harry Corona, general outside foreman, and his staff, includes the following safety features:

1. Reinforced vertical plates to keep rails from sliding into the motorman or motor in case of a sudden stop or a haulage accident.
2. View slot above the plates so that the motorman can see ahead when pushing.
3. A safe riding place for the triprider, eliminating his riding on the motor.
4. Safe storage for tools.
5. A reinforced steel-plate top to protect the men inside.
6. Complete enclosure on the tight side.



Automatic Slope Safety Brake Prevents Car Runaways

AN AUTOMATIC BRAKE, designed to prevent runaways of cars on slopes, has been developed by A. H. Genter, president, Dusquesne Supply Co., Pittsburgh. The new patented unit consists of a governor-controlled movable brake shoe mounted on top of a mine car.

A big headache at any slope mine using mine-car haulage is control of trips. A drag cannot be used and electro-magnetic controls usually are rather complicated. This new brake was developed as one answer to the problem of getting simplified control.

When speed of the car exceeds normal, the governor releases compressed air from a cylinder, permitting it to flow to a piston operating the brake. The brake is pushed against the roof and the car is wedged between the rail and the roof without being derailed.

Best results with the brake are possible when the roof is boarded and fairly smooth, the inventor reports.

Coal Loader Doubles as Truck, Crane and Scaffold

SEVERAL USES beyond that originally intended have been found for a Hough Payloader purchased for loading stock coal at the Pacemaker mine, Congleton Bros. Coal Co., Beattyville, Ky. One use, for example, is in the handling and transportation of supplies and light machinery to and from the yard, mine cars and shop.

The photograph above shows the start of construction of a re-screening plant for stocked truck coal. The shaker-conveyor pans on the ground by the loader were carried there in the bucket from the storage yard on the hill near the portal. A round-hole screen plate has been hoisted in the bucket and the man in it is sliding the plate onto the structure.

Mounting Motor on Top of Fan Simplifies Construction

COST OF FAN CONSTRUCTION at No. 3 mine of the Eagle Branch Coal Co., Manchester, Ky., was reduced by mounting the motor on the roof of the fan housing. The fan is a 5-ft Robinson unit, driven by a 10-hp Century motor. The concrete slab forming the roof serves as the foundation for the motor. A piece of sheet steel resting on a small enclosure of concrete blocks supplies sufficient weather protection for the motor.

For inspection and maintenance of the motor, the sheet steel, normally weighed down by two or three concrete blocks, is lifted off. This method of mounting was the idea of A. H. Burkett, superintendent.

WICKWIRE ROPE
A CF&I PRODUCT

Me? Ride to work on wire rope?

That's right. In the course of a year this young lady may travel as much as 150 miles with the aid of wire rope that safely and swiftly whisks her elevator aloft and then just as safely returns it to ground level. It's quite likely that she gets to her job with an assist from Wickwire Rope. Here again—as in so many other fields where wire rope is used—men who manage and maintain the nation's tall buildings have learned to place unbounded faith in the safety and reliability they get from Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1854

WICKWIRE ROPE

CF PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

"Big wheel"

of the 6-wheelers

New INTERNATIONAL RF-190 Series. GVW ratings, 30,000 to 38,000 lbs. 143, 157, 175, 193, and 211-inch wheelbases. Gasoline, LPG or diesel power.

Keeping operating costs down in a mining operation demands a truck that's built to stand up and take it—and stay on the toughest job. It takes a truck with stamina and power for maximum loads, brutal off-highway hauls, and steep grades.

It takes the "Big Wheel" of the 6-wheelers—INTERNATIONAL. Proved performance, *plus* the famous INTERNATIONAL bogie with the third differential, has made INTERNATIONAL sales leader in the 6-Wheel field for 18 straight years.

Your INTERNATIONAL Dealer can offer you exactly the right truck for your mining operation—from *the world's most complete truck line*. The way to start cutting your truck operating costs is to see your INTERNATIONAL Dealer, today. Time payments arranged.

23 new 6-wheel models!

GVW ratings, 22,000 to 90,000 lbs. Engines from 130 to 356 horsepower. Choice of gasoline or LPG power. Diesel engines available in models with GVW ratings of 30,000 lbs. and over. Transmissions, axle ratios for any needs. America's most complete truck line—170 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds **McCORMICK**® Farm Equipment and **FARMALL**® Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

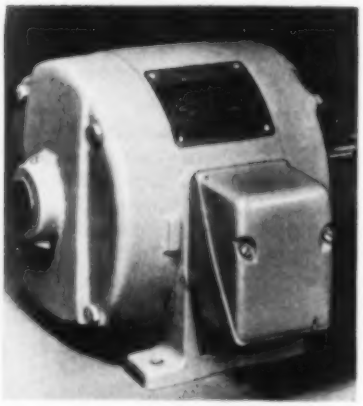
Better roads mean a better America

INTERNATIONAL® TRUCKS

"Standard of the Highway"

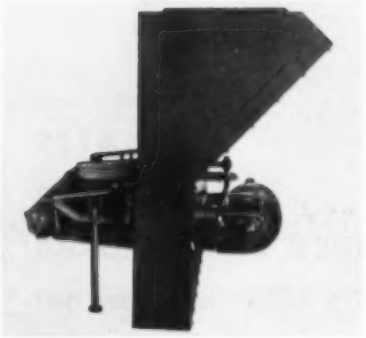
Equipment News

HOW TO ORDER . . . **more information on the new products and the free literature described in this section. As you check over the 62 items on these Equipment News pages, note the numbers of the items that interest you. Circle the numbers on the postage-free card facing p. 124, sign and mail the card. That's all there is to it. Coal Age will inform the manufacturers and they will gladly send the material you wish, without obligation.**



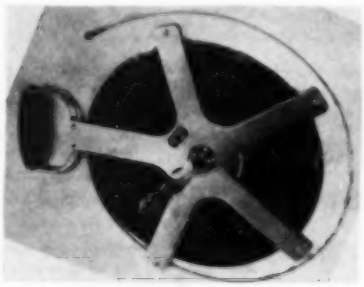
NEW AC MOTOR LINE WITH VARIED FEATURES (1)

A new line of polyphase AC motors offering better protection, more efficiency and quieter operation has been announced by the General Electric Co., Schenectady 5, N. Y. Called Tri-Clad "55," the new motors are built to latest standard NEMA frame dimensions and feature entirely new and advanced concepts of motor design, according to the company. With an average size reduction of 50% and 22% less weight per horsepower, the "55" retains rigid cast-iron construction and incorporates a new insulation system, bearing assembly and ventilation plan, it is said. Among the features cited by G.E. are a new insulating material eight times as strong as previously used materials; a new bearing assembly more tightly sealed and lubricated by a grease lasting at least five times longer; markedly reduced noise levels; and redesign of the totally-enclosed fan-cooled motor. The new motors will be available after the first of the year in the 182 and 184 frame sizes (1, 1½, and 2 hp at 1,800 rpm) in horizontal drip-proof and totally-enclosed fan-cooled models, and a complete line of gear-motors. Other types and larger frame sizes will become available later.



NEW AUTOMATIC UNIT FOR ANTHRACITE FIRING (2)

One of the recent developments in new anthracite-burning equipment, the "Fire-Jet" commercial and industrial anthracite burner converts existing steam and hot-water boilers to automatic firing and increases their output by at least 15%, according to the maker, Electric Furnace-Man, Inc., Emmaus, Pa. The new conversion unit is for either steel or cast-iron boilers, and while primarily designed to burn low-cost rice coal, even smaller barley sizes may be used and any standard grades of anthracite will deliver top performance, it is said. The increased output results from the unusual design which circulates water through the burner to the boiler and the heating capacity of 1 sq ft of active burner area is equal to 5 sq ft of prime boiler surface. The Fire-Jet consists essentially of a burner installed inside the boiler and gravity-fed with coal from a hopper outside. A standard 1,750-rpm motor drives a fan which forces air through the tuyeres in the burner (256 per square foot) and also supplies power to oscillate the burner periodically and distribute the coal evenly over the fire-bed surface. The operational simplicity of the burner is such that it is never necessary to clean the fire and maintenance is kept to a minimum, it is reported. The Fire-Jet burner is furnished in 10 standard sizes with burner lengths from 30 to 84 in in increments of 6 in, and in many instances, multiple installations may be made to extend application to the very largest heating loads. Details from E.F.M.

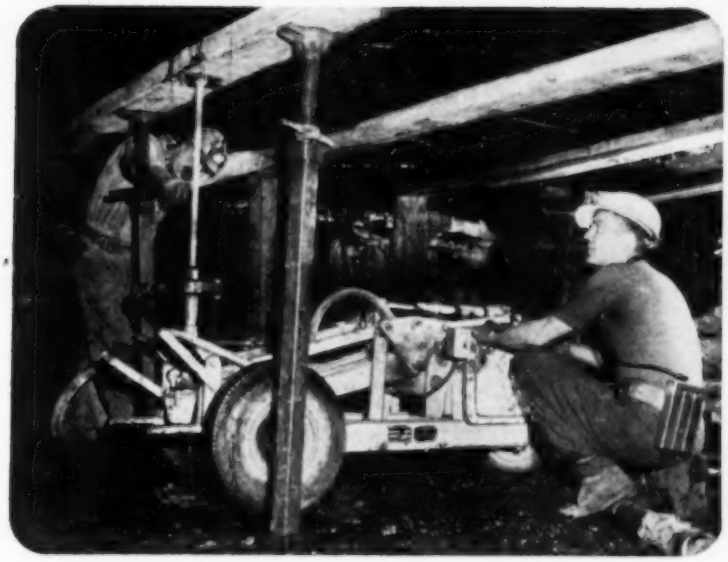


NEW-DESIGN MINE TAPE (3)

New Lufkin "Lucas" mine tapes feature a newly improved 5-arm reel specifically designed to accommodate long narrow tapes, which are made of the highest-grade tinned tape steel available and have the gradations and figures deeply stamped into nickel-silver sleeves securely soldered to the line, the maker says. The five metal arms of the durable nickel-plated steel reel hold the line in place without danger of overlapping or tangling, with a tape roller in each arm for smoother action. The reel is fitted with a long winding handle for better leverage and easier winding and a large drum for rapid reeling. Folder with specifications and prices for the "Lucas" tapes, available in various lengths, widths and graduations, is offered by the Lufkin Rule Co., Saginaw, Mich.

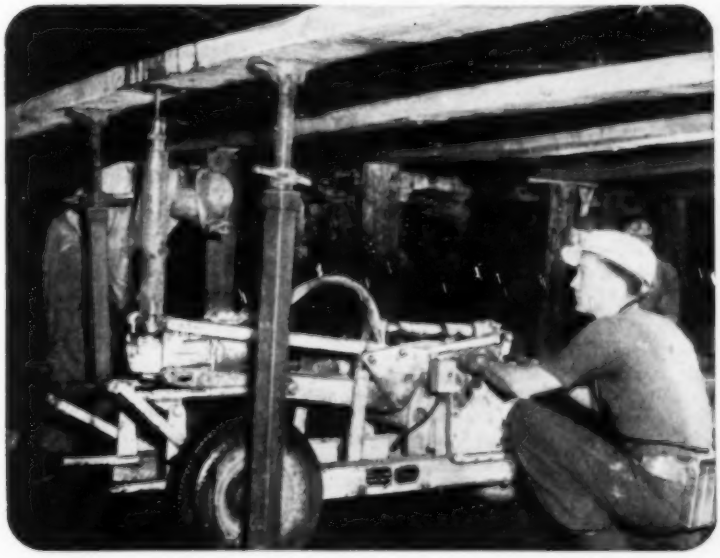
PERMISSIBLE LIGHTS (4)

Two new industrial flashlights designed for maximum safety have been announced by the Electrical Div., Olin Industries, Inc., New Haven 4, Conn. The flashlights, approved by both Underwriters Laboratories and the U. S. Bureau of Mines, consist of a 3-cell and 2-cell model. Both flashlights are of solid drawn brass with barrels completely



The first step shows the mobile RBD-30, equipped with a water swivel, drilling 48" bolt holes.

a must for every mine...



Without repositioning, the RBD-30 quickly sets the bolt.

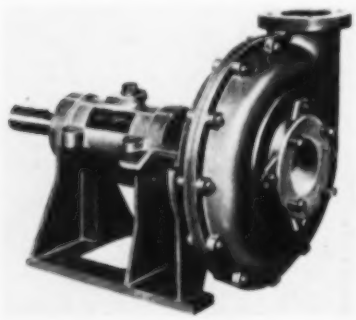
In high seams or in low seams Chicago Pneumatic's RBD-30 permissible Roof Bolting Unit drills hole and sets the expansion bolt without repositioning in only 3 minutes! Where hole depth is less than 36" – the complete bolting cycle can be made in 1½ minutes.

One motor drives both auger and bolt-setter – a telescopic chuck permits 10 inch auger adjustment to conform to roof irregularities. Slip clutches prevent feed motor from stalling–protect drill and bolt-setting motor. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

insulated with heavy corrugated fibre, end caps and lens rings thickly cushioned against breakage and a head design that inhibits rolling. A circuit breaker instantly cuts contact with the batteries if the bulb is broken to prevent sparking and the flashlights can easily be sealed to prevent unauthorized personnel from disassembling them.

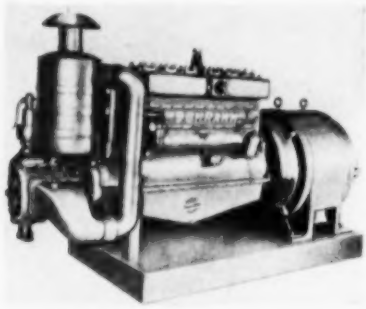


PUMP OPERATES WITHOUT SEALING WATER (5)

For pumping abrasive or corrosive solutions that must be delivered undiluted, the Allen-Sherman-Hoff Pump Co., Wynnewood, Pa., offers its new "Centriseal" pump designed to operate entirely without sealing water. In addition, the Centriseal is the A-S-H substitute for the Hydroseal pump wherever sealing water is unavailable and, like the Hydroseal, its pumping parts are protected by moulded Maximix rubber. For pumping acids, the stuffing box, packing gland and shaft sleeve are tailor-made of resistant alloys and mechanical parts are interchangeable with those of the anti-friction-bearing type of Hydroseal pumps. Full details from company.

GROOVED COUPLING (6)

Lightweight "Gruvajoint" couplings are designed to save time, weight, freight and space in coupling grooved pipe systems where pressures do not exceed 500 psi, can be applied and removed in about 1 min and may be used again and again, according to the maker, Gustin-Bacon Mfg. Co., Kansas City, Mo. The new couplings automatically absorb expansion and contraction, shock, ground motion and vibration, remain leakproof under end pulls up to 7,500 lb, permit layout misalignment up to 3 deg and withstand temperatures from 200 F to minus 65, it is said. They are available in 2-, 3- and 4-in sizes for permanent or temporary lines carrying air, vacuum, gases, water, oil, chemicals and pulverized minerals and rock and feature a sealing gasket of resilient synthetic rubber. Full data from company.



600-CFM COMPRESSOR (7)

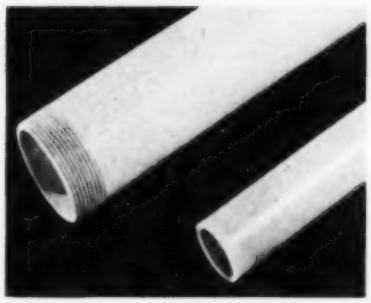
A new and larger industrial compressor, the Schramm Model 600 Super Unistage designed to provide 600 cfm of air at 100 psi, has been announced by Schramm, Inc., West Chester, Pa. Suitable for unit installation or as a central air supply, Model 600 is powered by a 150-hp induction motor (synchronous motors available) and while it has 43% greater capacity than the formerly largest Schramm unit, it requires little more actual floor space for installation. Model 600 is vibrationless, can be installed without an expensive foundation, easily moved on a fork truck and is available with running-water cooling or with cooling unit built-in, with or without a hood, it is said. Details from company.

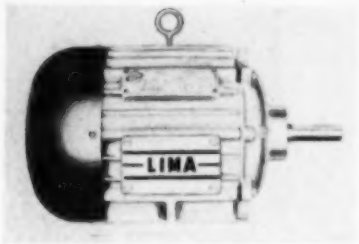
HIGH-HEAT LUBRICANT (8)

"D-A Lithium, Extra-Heavy," a new heavy-duty lubricant compounded to meet special needs where excessive heat is a problem, has been announced by the D-A Lubricant Co., Indianapolis 23, Ind. Designed around an unusually heavy base oil and an improved Lithium stearate to combine superior wear resistance with the ability to perform efficiently at extreme temperatures, "D-A Lithium, Extra-Heavy" is recommended by the maker especially for shovels operating close to upper limits and for particularly hot-running crushing plants, shaker screens, wheel bearings, etc., where moisture and temperatures are excessive. More data from company.

PLASTIC PIPE (9)

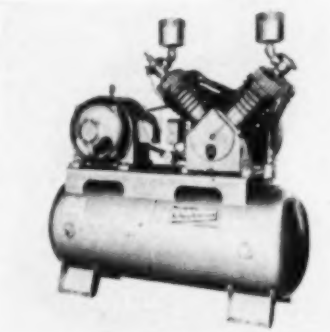
Carlon "V", a new rigid, polyvinyl-chloride plastic pipe which is said to feature excellent chemical resistance, tensile and flexural strengths, resistance to sunlight and long life, has been announced by Carlon Products Corp., Cleveland 5, Ohio. Weighing one-fifth as much as steel pipe, Carlon V is practically unaffected by all mineral acids, bases and salts, chlorine, oil, grease, gasoline, alcohol and carbon tetrachloride, and is completely immune to rot, rust and electrolytic corrosion, the maker reports. Full details on the range of sizes from ½ to 6 in available from Carlon.





MOTORS UP TO 20-HP (10)

New Type E design of totally enclosed fan-cooled motors available in ratings of ¾ hp at 900 rpm to 20 hp at 3,600 rpm in NEMA frame Sizes 224 to 326 has been introduced by the Lima Electric Motor Co., Lima, Ohio. Features cited by the maker include: rigid, seasoned cast-iron frames with integral feet; extra heat-dissipating surface for cooler operation; double-width prelubricated sealed ball bearings; and a specially designed cast-aluminum high-velocity fan preventing accumulation of dust, dirt or other foreign matter on motor frame. The motors can be supplied for vertical, wall or ceiling mounting, as well as standard horizontal floor mounting, and a 1-yr guarantee is issued with each motor. Bulletin from company.



COMPRESSOR LINE WIDENED (11)

The Kellogg Div., American Brake Shoe Co., Rochester 9. N. Y., has announced addition of 15- and 20-hp air compressors to its line, which now includes air compressor units from ½ through 20 hp, with displacements up to 105.9 cfm. Of V-type construction, the

B.F.Goodrich

Three recaps—and these Universal tires are still going strong!

THE truck above belongs to a firm that strips coal in West Virginia and Pennsylvania. It hauls giant loads of coal 20 hours a day, 6 days a week over roads covered with slag and stony shale. Here is tire-killing work, yet these B. F. Goodrich Universals have been recapped *three times!*

The company reports it often gets as many as 4 recaps per tire, thanks to the patented B. F. Goodrich nylon shock shield. Layers of strong nylon cords under the tread stretch together to protect the tire body from shocks. Result: Universal tires give you more hours of service, more recappable tires and more hours of service per recap, increased bruise resistance and less danger of tread separation. You pay nothing extra for the BFG nylon shock shield.

This coal stripper also reports Universal tires give traction far superior to that obtained from other makes of tires. Husky, wedge-shaped cleats grip the road, defy dangerous slippage. You get full traction in reverse or forward. And the tread is specially compounded to resist cuts and snags.

The Universal is one of the complete B. F. Goodrich line of off-the-road tires that pull through the roughest jobs, give you bonus hours of service. See your local retailer. The address is listed under Tires in the Yellow Pages of the phone book. Or mail the coupon.

Specify B. F. Goodrich tires when ordering new equipment

COAL STRIPPER SAVES 50% on tire costs because he is able to recap BFG Universal tires. These non-directional tires can be mounted on any wheel position. You need fewer spares.

UNIVERSAL TIRES PULL UP A STEEP HILL to the tipple. Company switched to these BFG tires after it was pointed out that they could get through where others bogged down.

The B. F. Goodrich Company
Tire and Equipment Division
Department TO-292, Akron 18, Ohio

Please send me:

- ☐ Free information on off-the-road tires
- ☐ Free book, "How to get more recaps out of truck tires"
- ☐ Name of my nearest retailer

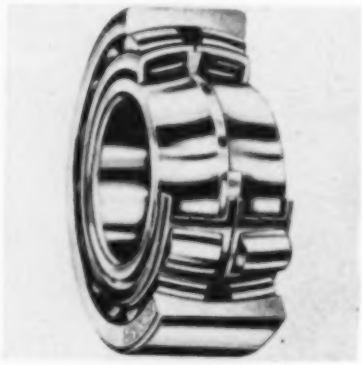
Name_____

Company _____

Street _____

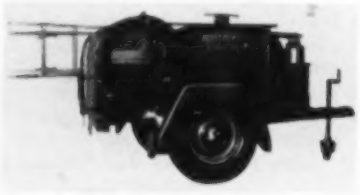
City _____ Zone____ State_____

new Kellogg-American 4-cylinder 2-stage air compressors are available in 22 different models for a wide range of applications. Model BD461A, the tank-mounted unit shown, features dual controls which permit either automatic stop-start operation for intermittent use or automatic intake unloader operation for constant air demand. Bulletin C-461 offered by company.



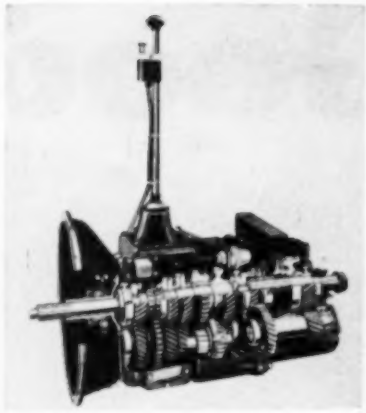
MORE BEARING SERVICE (12)

Increased anti-friction-bearing capacity of from 25 to 50% and service life 2 to 3½ times longer than formerly possible without change in size and weight are obtained with SKF's improved design of spherical roller bearings, according to the maker. Where combined loads are present, the improved spherical bearing is capable of carrying heavier combinations of radial and thrust loads, or pure thrust loads of greater magnitude, it is said. The SKF rolling self-aligning feature has been preserved, so that considerable misalignment between the shaft and housing has no ill effect on bearing capacity or life, the company reports. Full details on the "C" type bearing, available in Series 222 and 223, are provided in a 12-p Booklet 365 from SKF Industries, Inc., Philadelphia 32.



PORTABLE FIRE UNIT (13)

"Porto Pumper" unit fitted with essential equipment for fire fighting, is available on rubber-tired mounting for easy coupling and rapid moving by truck, auto or tractor, and can be supplied with track mounting. Ready for instant use on arrival at fire, the pumping unit is connected directly to a 200-gal water tank, but can be quickly demounted and carried to any water source. Hose equipment provides for operation with straight steam nozzle, fog nozzle, foam play pipe and water-wetting agents and no special training is necessary, the maker reports. Full details from Porto-Pump, Inc., Detroit 7, Mich.

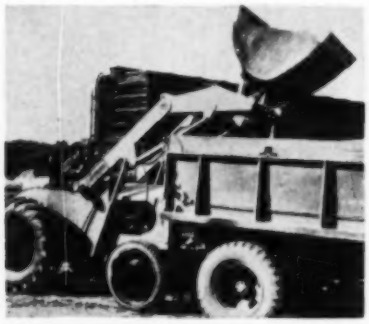


TRUCK SHIFTING CUT (14)

Drivers of highway rigs in the 125- to 160-hp engine class, delivering up to 385 lb-ft of torque, now can utilize eight speeds forward with a new "one-stock—no gear-splitting" transmission, the Fuller R-45, the latest addition to the "Roadranger" transmissions developed by the Fuller Mfg. Co., Kalamazoo, Mich. The eight forward speeds are secured by using a 4-speed shifting pattern twice, the first time with the auxiliary section in low gear or low range; second, with it in high gear or high range. One-lever ease is obtained by a synchronized electric-air power shift between ranges, actuated by a convenient button at the shift lever, by which the operator can preselect the desired range. According to the maker, the new R-45 Roadranger results in one-third less shifts; gear-splitting is eliminated; rpm loss between shifts is minimized; engine lugging is sharply reduced; more weight can be carried over the payload axle; and greater fuel economy is obtained. Full data from Fuller.

LOW-COST HOIST (15)

The Heil Co., Milwaukee 1, Wis., has announced its new twin-cylinder Model 2426 hoist specifically designed for platform bodies 8 to 17 ft long and dump bodies 8 to 10 ft long as a low-cost lightweight but sturdy all-hydraulic hoist. Operating features cited by the maker include a 50-deg dumping angle for swift and positive dumping, even wet, sticky dirt; a low first cost because of simplified construction; a new low in mounting height; greater payload because of lighter weight; and mounting by any competent mechanic in a few hours' time. Full details in Bulletin 53103 offered by Heil.



MORE DIGGING POWER (16)

Lessmann Mfg. Co., Des Moines, Iowa, has announced new improvements on all three models of its hydraulic Power-Crown loader, which is said by the company to now exert a forward thrust of 15,000 lb. while the unit is standing still, to permit shovel loading of even frozen sand and aggregate and digging in unusually hard or compacted soils. The Lessmann loader will dig 12 in below wheel level, has interchangeable bucket capacities from ⅝ to 1¼ yd, with various other attachments available, and will load in front end of the highest truck when the truck is approached from the rear, the maker reports.

SIDE-DUMP BODY (17)

A new special side-dump body, the "Galion Side-Dumper," announced by The Galion Allsteel Body Co., Galion, Ohio, is said by the maker to be the first side-dump body to employ double lift-arm action on a standard dump-truck application, thus assuring a well-balanced controlled thrust from the hydraulic hoist. Bodies can be made from 8 to 10 ft long, with capacities of 3 to 6 cu yd. The unit is recommended by the maker for operations on narrow roads where dumping is on the berm or where dumping must be made in limited areas or into troughs, hoppers, etc. This special Galion-body can be constructed to dump either to the right or left and dump angle is 45 deg. Details available from Galion.

Equipment Shorts You'll Want to Check

(25) HOSE COUPLINGS & ASSEMBLIES—A new department devoted to the manufacture of hose couplings and assemblies, and specializing in hydraulic-hose equipment, has been announced by the Central Mine Supply Co., Mt. Vernon, Ill. Both pressed-on and re-usable hose fittings are available.

(26) FOR USERS OF STORAGE BATTERIES, a new cell-puller developed by Gould-National Batteries, Inc., Trenton, N. J., is useful in removing cells from batteries for examination or repair. The tool, generally used in sets of two, consists of a U-shaped steel loop brazed to a hexagonal steel nut. The nuts are screwed down over the lead posts, a piece of wood is placed in the loops and the cell is pulled from the battery by a chain or rope. The same tool is also used with hold-down clips for removing the elements from the jar.

(27) V-BELTING-FASTENERS—Everything needed to make up V-belts of any length is included in its new Alligator V-belt-drive units, according to the Flexible Steel Lacing Co., Chicago 44. Introductory units contain Alligator open-end V-belting, fasteners and tools. Replacement units contain belting and fasteners. Units, furnished for A, B, C, and D drives, are particularly designed for emergencies and when correct endless belt is not available.

(28) FIRE-RETARDANT PAINT, newly developed "Fyr-Kote," is easily applied by brush or spray and is said by the maker to actually stop fire from spreading since when exposed to flame it releases carbon dioxide and calcium chloride which smothers the flame and retards its spread. Fyr-Kote is an oil-base fire-retardant interior flat wall paint listed by Underwriters Laboratories and is available in white and six colors. Bulletin from Fyr-Kote Co., Div. of Morris Paint & Varnish Co., 27th & Douglas, Omaha, Neb.

(29) A "COLD" PARTS-CLEANING UNIT for flushing, spraying, or soaking metal parts, dies, large bearings and assemblies has been announced by the Graymills Corp., Chicago 13. The Model H-95, measuring 5x3 ft and 3 ft 2 in high, has an abrasive-proof pump delivering a gusher-like flow of cold parts-cleaning solvent through both a heavy stay-put flexible metal hose and a flexible hose, and the pump is also used to circulate fluid in the tank by jet action to speed cleaning of parts that are to be soaked or immersed. The tank holds 100 to 175 gal of solvent.

(30) ALL-WEATHER GREASE—A "global grease" said to perform effectively in desert or arctic operations has been developed by research laboratories of the Texas Co., New York, particularly for use in military vehicles. Known as Texaco "All Temp Grease," the new lubricant reportedly possesses the following characteristics: good low temperature operation, excellent shear stability, high oxidation resistance, good rust and corrosion protection for metal parts, and the capacity to perform even when contaminated with water.

(31) FOR MACHINERY CLEANING, Scott Paper Co., Chester, Pa., has announced a specially designed industrial paper-type wiper that is said to be clean, strong, safe and uniform and also offers the advantages of being highly absorbent, versatile, always handy and easily disposable. It is packaged in a compact size box containing 125 wipers, with 18 boxes to a case.

(32) NEW FIRE-RESCUE SUIT, field tested at temperatures up to 1,800 F, has been announced by Industrial Safety Specalties Co., Inc., Perkasie, Pa. Known as the ISSCO fire-rescue suit, it weighs only 28 lb. The light weight, combined with extreme pliability, permits the suit to be donned without assistance in less than 1 min, as well as providing exceptional freedom of movement under all fire conditions, the maker says.

(33) AIR-TOOL OILER designed to eliminate equipment wear and breakdown from lubrication failure features a patented wick filter that prevents clogging and completely atomizes the oil for better lubrication, plus an oil-metering valve that cannot vibrate shut, the maker says. Made in ½- and 1-pt. sizes the Wright oiler is light enough to be attached directly to any pneumatic tool, and provides a steady regulated oil flow in all positions, normal, upside down, or on either side. Details from Wright Power Saw & Tool Corp., Stratford, Conn.

(34) HYDRAULIC TAILGATE—New and improved "Heiloader" hydraulic-powered elevating truck tailgate, now available from the Heil Co., Milwaukee 1, Wis., is an all-hydraulic unit that can be mounted on any truck and lift a maximum 2,000-lb payload. New operating and safety features are incorporated into the improved Heiloader enabling one man to handle heavy or bulky objects with complete safety and without strain, the maker says, and two platforms are available for the unit, a ramp type, and platform, or square edge, type. Bulletin BH-53105 gives full details.

(35) ULTRAVIOLET LIGHT—"Black Wand Fluoretor" ultraviolet unit offers ready portability and independence of normal power outlets in applications of ultraviolet light in mining, prospecting and materials testing. Resembling a large flashlight in appearance, it weighs only 1¾ lb, including two standard flashlight batteries. Literature and details from Menlo Research Laboratory, Box 522, Menlo Park, Calif.

(36) DUMP BODY—The Galion Allsteel Body Co., Galion, Ohio, has announced its first new model under its recent decision to construct all Galion standard dump bodies of high-tensile steel, the Model 12-3 contractor's body, 8 ft long, 78 in wide inside and 90 in wide over-all. Body construction of high-tensile steel permits over-all weight savings up to 25% and the new body also offers four to six times greater corrosion resistance than ordinary dump bodies, according to the maker.

(37) SHOVEL-LOADER—New Model WSL swing loader with 180 deg lateral swing for loading and dumping, without awkward tractor maneuvering, is now available from the Wagner Iron Works, Milwaukee, Wis. Developed for wheel and light crawler tractors, the unit can swing 90 deg on either side of the tractor for loading or dumping and can lift and crowd loads up to ½ ton to a height of 10 ft. Because of its design, it requires no stabilizers and has more than a 150% safety factor against tipping, the maker says.

(38) ULTRAVIOLET LAMPS—A new line of improved "Blak-Ray" (blacklight) lamps designed for use in inspection procedures, flaw detection, control, etc., has been announced by Ultra-Violet Products, Inc., S. Pasadena, Calif. Units for Blak-Ray lamps range in size form 4 to 120 w, with replaceable tubes lasting 3,000 to 6,000 hr. Company bulletin gives full details.

(39) REFLECTOR LAMPS—An expanded line of six reflector lamps in various ratings is now available from the Lamp Div., Westinghouse Electric Corp., Bloomfield, N. J. Requiring no labor for maintenance other than relamping, they are particularly applicable for high-bay lighting where it is difficult and expensive to clean conventional lamps and fixtures and are designed for a life of 2,000 hr with high light output throughout. Details from company.

(40) AUTOMATIC WELDER—for larger shops, the Leader Model 700 has a heavy duty head, with a 1,200-amp DC current source which can also be used individually as three 400-amp manual welders, and features two control panels. The pedestal is motorized with a 96-in travel, and rotates through 360 deg, with built-in locking and limit switch controls. The 132-in cross-arm has an acme-actuated, variable-speed reversible drive motor (20:1 ratio) for carriage traverse. Full details from Leader Welding & Mfg. Co., Berkeley 2, Calif.

(41) AIR COMPRESSOR—A new 600-cfm diesel-powered portable compressor, announced by the Davey Compressor Co., Kent, Ohio, is known as the "Davey Super Chief 600" and is available in both skid and 4-wheel-trailer mounting styles. The largest in the Davey line, the Super Chief 600 has four low-pressure cylinders with 8-in bore and 4-in stroke, and two high-pressure cylinders with 6½-in bore and 4-in stroke.

(42) AUTOMATIC HARDSURFACING—A new technique for automatic hardsurfacing in which the alloy content of the deposited metal is supplied by an ag-

P & M COAL CO. REPORTS:

17% FASTER OPERATION WITH CATERPILLAR POWER

THIS Bucyrus 10-W Monighan walking dragline strips 410 yards of overburden every hour, on a 24-hour schedule at a bituminous pit of P & M Coal Co. near Hallowell, Kans.

The rig works 17% *faster* since repowering with a husky Caterpillar D397 Diesel Engine, which bosses an 80-foot boom through a Twin Disc torque converter and Foote Brothers gear reducer. The 500-horsepower D397 is built to operate without pampering, with no more than routine service. "We can get service now, which we couldn't with our former power," says Edwin R. Phelps, general superintendent for P & M.

The company expects this kind of performance. They're extensive users of Caterpillar equipment. A Cat* D11000 powers starting and working compressors, and lights and fans on this same dragline. P & M also owns a Caterpillar-powered Bucyrus-Erie loader and ten Caterpillar track-type Tractors.

Like P & M, you can count on reliable-running, reliable-starting Caterpillar power, even in below-zero weather. And, because of Caterpillar's exclusive fuel injection design, you get full, foul-free power on money-saving No. 2 furnace oil.

Leading manufacturers can supply Caterpillar power in their machines. And when it's time to repower, it's time to ask your nearby Caterpillar Dealer about the 12 engine sizes to 500 HP, and electric sets to 315 KW.

Caterpillar Tractor Co., Peoria, Ill.

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glomerated granular flux rather than by the electrode has been announced by the Lincoln Electric Co., Cleveland 17. According to the company, it is now possible to apply automatic hardsurfacing with conventional mild steel electrode simply by substituting the new hardsurfacing flux for the mild steel flux normally used, retaining all the proven advantages of hidden arc welding such as uniform feeding and exact arc control. Also, by diluting the hardsurfacing flux with mild steel flux, hardsurfacing properties can be matched exactly to service requirements, it says. Details on the two new fluxes available from Lincoln.

(43) **ROLLING STEP LADDERS** that may be easily and quickly moved but that automatically become immovable and "lock" to floor as soon as a person steps on them have been announced by the Precision Equipment Co., Chicago 41. Made in four models up to six steps, the "automatic action" safety step ladders feature aluminum-finished steel throughout.

FREE BULLETINS AVAILABLE

(44) **EXPLOSIVES**—New 48-p Catalog 12 titled "Atlas Explosives Products" offers specific aid in the selection of industrial explosives for underground and strip mining, quarrying and construction, seismic prospecting and other applications. Including more than 80 illustrations and a score of tables, the booklet summarizes the methods and explosive materials commonly specified for most effective and economical results and describes and tabulates properties of various explosives, blasting caps, fuse, blasting equipment and accessories, together with a section on the Rockmaster (millisecond delay) system of blasting. Available from the Explosives Dept., Atlas Powder Co., Wilmington 99, Del.

(45) **MAINTENANCE TRAINING COURSES** available at the Euclid Service Training School are described in a new folder issued by the Euclid Road Machinery Co., Cleveland 17, Ohio. The company offers various week-long courses in the operation and maintenance of its truck and scraper equipment, open to customer and dealer personnel without charge. Folder gives full information.

(46) **BELT CONVEYORS**—Presenting a new concept of the economy, utility and simplicity of belt conveyors, a new Catalog 76-A has just been issued by Barber-Greene Co., Aurora, Ill., showing its entire range of standardized belt conveyors. Each standardized component and accessory is illustrated and described with line drawings showing the relationship of the unit to the entire conveyor. In addition, the range of application of each unit is tabulated for quick reference. The catalog includes 60 p of typical conveyor layouts and installation photographs, with full details of conveyor accessories, shuttle conveyors and stackers and car unloaders.

(47) **AUTOMOTIVE BATTERIES**—Revised up-to-date edition of an informative 24-p booklet on automotive and truck storage batteries now is available from the Electric Storage Battery Co., Box 8109, Philadelphia 1. Entitled "The Storage Battery, its Fundamentals, Use and Maintenance," it decribes in nontechnical language how a battery operates and how to keep it performing at maximum efficiency throughout its life. The booklet has been used as a basic textbook by schools, autmobile associations and similar groups for instruction of passenger car and truck drivers, automotive service men, etc.

New Movies Offered For Group Showings

(50) **"Conveyors Only Look Alike,"** a new 16-mm sound color film, graphically illustrates the application of Barber-Greene's complete line of portable belt conveyors, plus a belt-type car unloader and many special units and accessories. Almost 50 different applications are shown to illustrate the engineering and structural features of the equipment and many actual examples of production and cost data are cited. Arrangements for showings may be made with Barber-Greene Co., Aurora, Ill., or any company representative.

(51) **"Digging for Your Future,"** a 30-min sound-color 16-mm motion picture available from Bucyrus-Erie Co., S. Milwaukee, Wis., is described in detail in a folder offered by the company. The film tells a two-fold story: how Bucyrus-Erie products are conceived, designed, built and tested; and how they are applied in a variety of earthmoving jobs in many fields. Circle 51 on postage-free card for descriptive folder.

(48) **V-BELT DRIVES**—New 52-p technical manual comprehensively convering all elements of V-belt drives, complete with tables, graphs, and diagrams is being offered by the Boston Woven Hose & Rubber Co., Box 1071, Boston 3, Mass. Compiled as much for maintenance supervisers, mechanics and purchasing agents as for the engineering group, the manual has tables charting the new V-belt industry numbering system togther with the numbering systems of each major manufacturer, and covers such subjects as how to select a V-belt drive, the easy way to select a V-flat drive; useful information; V-belt-drive design; nonstandard drive instructions; speed-up drives; etc.

(49) **COAL FLOTATION**—How the Denver "Sub-A" flotation process provides a low-cost method to recover waste coal fines to produce a low-ash, clean product (minus 20 mesh to O mesh) is discussed in Bulletin F10-B77 offered by the Denver Equipment Co., Denver 17, Colo. The folder also describes flotation machines available on a loan basis for "on-the-job" pilot testing in your own plant and also discusses the testing facilities offered by the company's laboratory.

(52) **CENTRIFUGAL PUMPS**—Ingersoll-Rand Co., New York 4, has issued a new 18-p Bulletin 7251 with detailed data on its Class "CNTA" multi-stage centrifugal pumps. Specifically designed for boiler feed, refinery, process work and mine-pumping services, the units now are available for all pressures from 300 to 1,000 psi with capacities to 700 gpm and are said to feature higher efficiency, easier maintenance and complete operating balance.

(53) **SHOVEL - LOADER**—Application and operating features of the Hough Model HR 4-wheel-drive Payloader 1-yd tractor-shovel are thoroughly covered in

a new 16-p Catalog 255. Included also are photos and detailed specifications of all seven sizes of Payloaders. From The Frank G. Hough Co., Libertyville, Ill.

(54) TESTING INSTRUMENTS—A 16-p buyer's guide on electric testing instruments is offered by the General Electric Co., Schenectady 5, N. Y. Bulletin GEA-5469B provides application data, features and prices on such instruments as hook-on volt-ammeters watt-meters and power-factor meters, portable recorders, voltmeters and ammeters, phase-sequence indicators, hand pyrometers, surface roughness scales, insulation-resistance meters, and others.

(55) FAST, LOW-COST HARD SURFACING by combining metal-spraying and torch-fusing for simplified high-speed application of super-hard surfacing alloy is described in Bulletin 53B from the Metallizing Engineering Co., Long Island City 1, N. Y. The bulletin describes various applications of this new, fast low-cost process of applying hard surfaces, such as acid sludge-pump rods, deep-well pump rods, guide wheels, etc.

(56) TRANSMISSION BELTING—Booklet A5163K from Goodyear Tire & Rubber Co., Akron, Ohio, describes Thor rayon transmission belting, a new belting with rayon plies instead of conventional cotton said to have been proved in field applications for more than 4 yr on jobs specially selected for their severity and to be superior to similar belting manufactured in top quality with cotton plies.

(57) ELEVATOR BUCKETS—Link-Belt Co., Chicago 1, offers a 12-p Book 2465 on its complete line of cast malleable and Promal elevator buckets, which are designed with smooth and seamless interiors, well-rounded corners to promote easy discharge and reinforced corners for added strength. Covered are 55 standard sizes with dimensions, weights and capacities and detailed information on mounting of buckets on belts and chains, with tables and diagrams on bucket punching.

(58) MULTI-STAGE CENTRIFUGAL PUMPS—Bulletin 237-C from Pennsylvania Pump & Compressor Co., Easton, Pa., describes Thrustfre 2-, 3- and 4-stage pumps for heads up to 650 psi with capacities of from 50 to 850 gpm. Available in both sleeve-bearing and ball-bearing designs for boiler feeding and general power plant and industrial use, the pumps achieve inherent dynamic, hydraulic balance by a patented method, the bulletin points out.

(59) ENGINE SUPERCHARGERS—How Miehle-Dexter units boost the power of diesel and gasoline engines is discussed in Bulletin 153 issued by the Miehle-Dexter Supercharger Div., Dexter Folder Co., Racine, Wis. Providing full specification and application data, the folder reports that the addition of a Miehle-Dexter supercharger to current or projected engine designs is easily accomplished, and is often a less costly way to obtain additional power without increasing space requirements or engine weight.

(60) OVERLOAD RELAYS — Complete engineering data, model specifications and information on application of the Type C Silic-O-Netic overload relays for positive protection in a compact unit is provided in Bulletin 5101A offered by the Heinemann Electric Co., Trenton 2, N. J. Included is a complete description of the hydraulic-magnetic operating principle, along with outlined data on the hermetically sealed time element.

(61) DUCTING—Bulletin C-2-5 from the Flexible Tubing Corp., Guilford, Conn., provides application data and specifications on Flexflyte small-diameter flexible ducting available in diameters of ⅛ to 10 in for handling of air, fumes, dust or materials via suction, pressure or gravity.

(62) AIR COMPRESSORS—Worthington Corp., Plainfield, N. J., offers a new bulletin covering its line of portable "Blue Brute" air compressors ranging in capacity from 30 to 600 cu ft. Bulletin H-850 thoroughly describes and illustrates the numerous design features and applications of the units, with detailed capacity and specification data. All models are two-stage air-cooled units and are either gasoline-engine or diesel driven with the exception of the gasoline-powered 30- and 60-cu ft models.

(63) VIBRATING SCREEN — Booklet 122J describing in detail its new Style J Vibrex vibrating screen is available from Hewitt-Robins, Inc., Stamford, Conn. Available in various sizes, the J-Type Vibrex screen is made with a single deck for suspended mounting only and is offered in two styles, with the vibrator either above or below the screen deck.

(64) AIR AND HYDRAULIC VALVES—New 12-p condensed Catalog 531 describes the "Quick-As-Wink" line of air and hydraulic control valves, valve couplings, etc. It includes sectional views, sizes, actions, permissible pressures, temperatures and other application details. Offered by C. B. Hunt & Son, Inc., Salem, Ohio.

(65) TARPAULINS—Pamphlet with the complete specifications of Dandux "Penguin" tarpaulins includes sizes and weights, and also complete descriptions of Dandux painters' drop cloths. Both products are manufactured and treated in Daniels' own cotton duck mills. From C. R. Daniels, Inc., Daniels, Md.

(66) HYDRAULIC HOSE—A Wiretex rubber-covered hydraulic-hose "Selector" is offered by the Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 2, Ohio. Starting with any known factor, such as the I.D., O.D., minimum burst, working pressure required or bend radius, a designer or maintenance man can use the selector to determine the proper hose for the desired application.

(67) SILICONE PRODUCTS — New 1953-54 Reference Guide to Dow Corning silicone products describes them in terms of operating and service characteristics and is called the most thorough and comprehensive listing of silicone products ever published. Fifteen new products ranging from adhesives to molding compounds, have been added and the application index has been expanded to include three new categories. Offered by Dow Corning Corp., Midland, Mich.

(68) AUTOMATIC LUBRICATION of entire conveyor lines—trolley wheels, chains, drives, carriers and rollers—without stopping the line is illustrated in a new Catalog Sheet 22-225 (Rev.) distributed by the Alemite Div., Stewart-Warner Corp., Chicago 14. The utilization of Alemite's conveyor trolley-wheel lubricator, Accumeter centralized lubrication and Oil Mist, all fully automatic, insures economic and dependable lubrication of entire lines, with savings in oil used up to 90%, the company says.

(69) SHEET PACKINGS—Folder 853 on industrial rubber sheet packing, offered by the Hamilton Rubber Mfg. Corp., Trenton 3, N. J., contains full data on the weight, tensile, and hardness of rubber sheet stocks.

Why "breathing space" between each wire?

- To provide maximum flexibility—tiny, precise amounts of "breathing space" are engineered between each of these wires.
- There are 295 wires in this particular construction . . . 9 different sizes of wire.
- All wires are drawn in Macwhyte's plant to assure uniform quality.
- Heavy, tenacious lubricants fill the spaces between wires. This *Internal Lubrication* guards against corrosion and friction, and also increases flexibility.
- Macwhyte's PREforming process forms the wires and strands into a spiral so they lie naturally in place with a minimum of internal stress.
- From a thousand and one wire ropes, Macwhyte engineers are ready to recommend the right rope for your particular needs. For best, lowest cost wire rope service, write today for recommendations of the best constructions of rope to use on all your equipment.

This Macwhyte Rope is 6 x 41 Filler Wire PREformed Lang Lay Monarch Whyte Strand with IWRC, just one of the thousand and one wire ropes made by Macwhyte.

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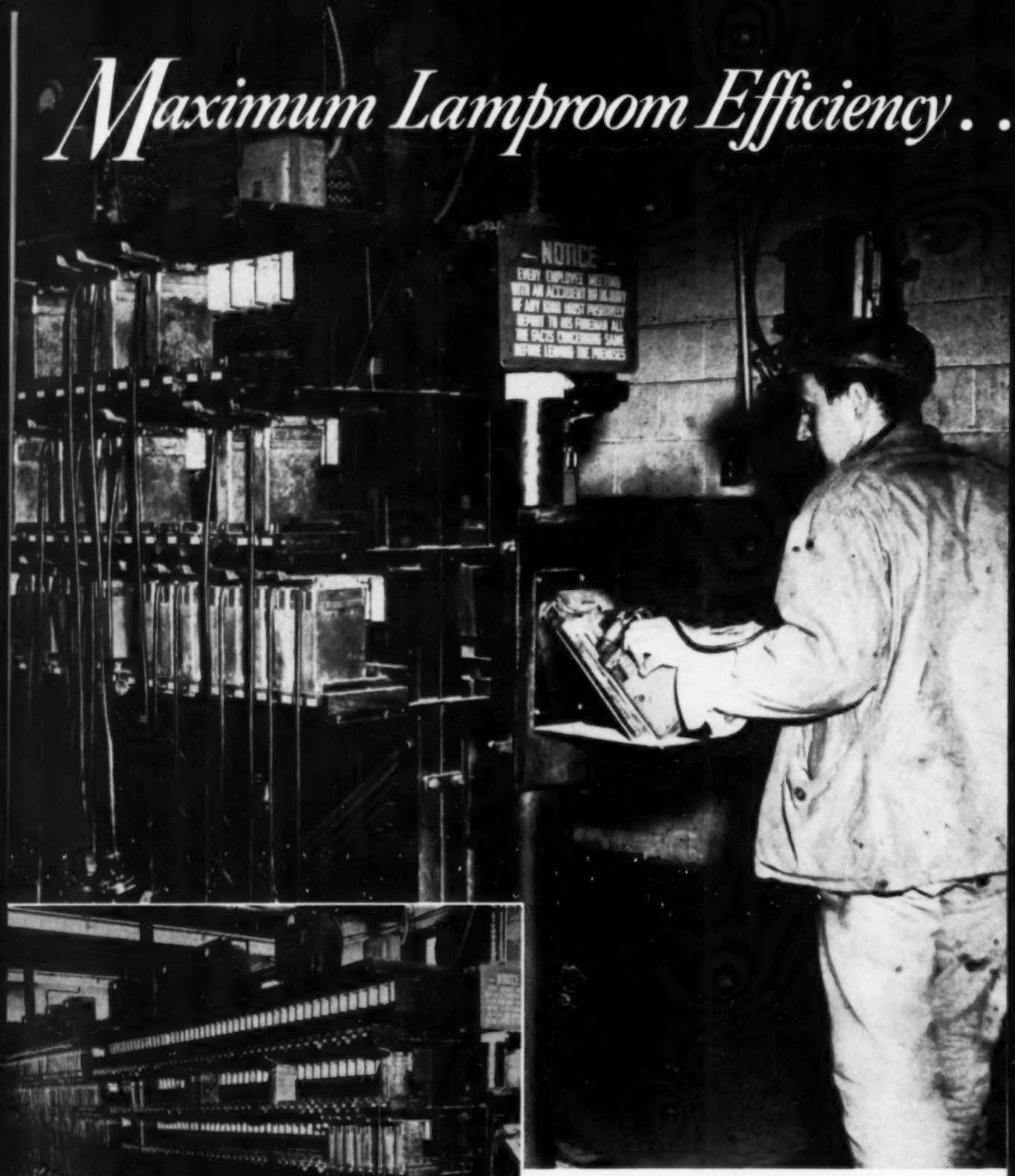
THE RIGHT ROPE FOR YOUR EQUIPMENT

Ask for G-15 Wire Rope Handbook

Macwhyte Company, *2931 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.*

Maximum Lamproom Efficiency . .



It takes but a minute, on an average, for a miner to enter the lamproom, replace his lamp in the charging rack, and head for the shower room.

The charging racks are arranged conveniently between lamproom entrance and the shower room so that lamps are available from two aisles for quick distribution. Any needed lamp repairs are made daily by the lamp attendant, and Warwick management feels that this efficient lamproom operation has reduced to a minimum a common cause of lost man-hours—underground failure of miners' lamps.

. Minimum Maintenance

WARWICK MINE

gets BOTH

with the EDISON R-4 Electric Cap Lamp

With a total of 12 working sections on a three-shift-per-day schedule in Duquesne Light Company's Warwick Mines No. 1 and No. 2, it was essential to select a miner's lamp that would provide not only brilliant, unfailing illumination, but also maximum lamproom efficiency at lowest maintenance cost.

How effectively the Edison R-4 has answered these added requirements is a matter of record. Since the self-service installation of Edison R-4 Lamps in 1949, lamp distribution has never bottlenecked personnel during shift changes. As for maintenance, the design and construction of the Edison R-4 has brought about an economical balance of time for lamproom attendants. Only a portion of each shift time is necessary for complete lamp care. The remainder of the shift is devoted to other duties around the change house.

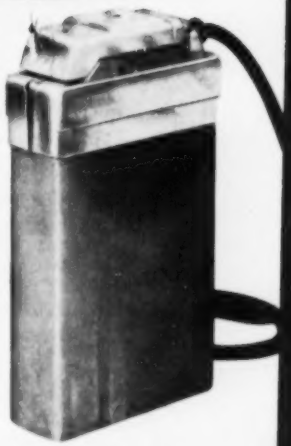
The Edison R-4, according to Mr. Stephenson, Superintendent, has proved highly suitable for self-service handling, and has demonstrated by performance underground its ability to provide continued brilliant, dependable light.

EDISON R-4—BEST IN ANY LAMP DISTRIBUTION SYSTEM

SELF-SERVICE SYSTEM

MODIFIED SELF-SERVICE SYSTEM

STANDARD SERVICE SYSTEM



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Eimco Agidisc Filters for Dewatering Coal Fines

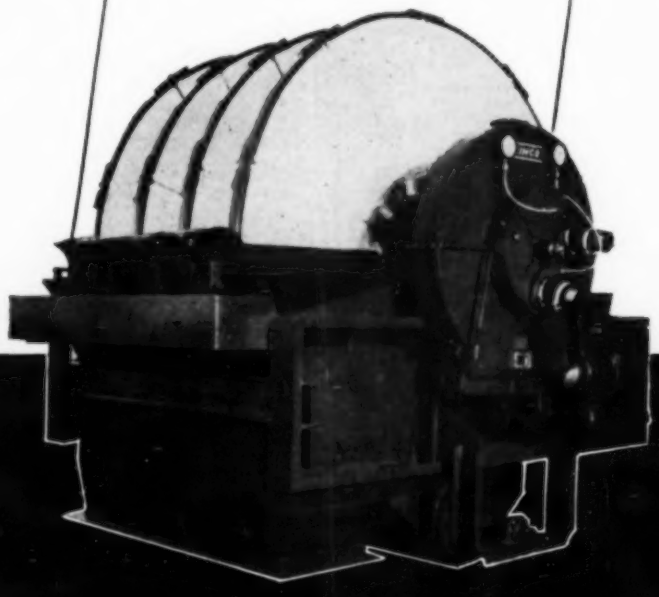
Highest production of salable product per ton of coal mined

Coal fines washed out of mine run coal in the cleaning plant represent a product worth saving both in quantity and quality.

Many companies in coal mining districts all over the country are finding that compliance with anti-pollution laws is actually going to return them a profit.

Eimco filters used in dewatering coal fines have been selected by most progressive companies because: (1) Eimco offers the only reliable, heavy-duty unit for the job that is simple and free of trouble making gadgets. (2) Eimco's will operate continuously with a minimum of attention. (3) Cakes on Eimco filters are smooth and uniformly dried over the entire surface. (4) More tonnage is filtered per square foot per hour. (5) Eimco discs and Agidisc occupy less floor space per foot of filter area. (6) Better filter bag life, and many other advantages.

Write for more information.



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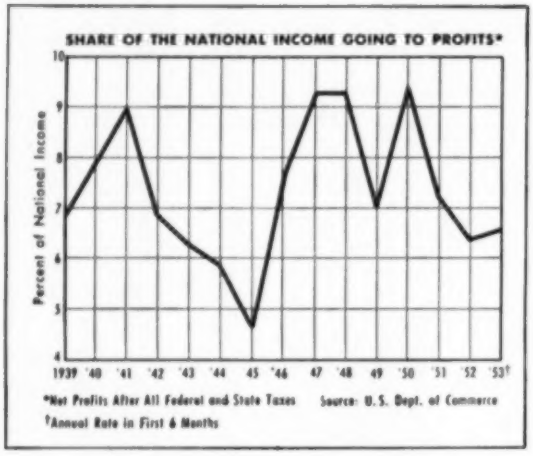
The first of two articles on profits

PROFITS...How High Are They?



How high are profits? What is being done with them? This is the first of two articles designed solely to throw some factual light on these key economic questions.

One of the important economic developments of 1953 has been a substantial increase in the dollar volume of corporation profits from the level of 1952. But to answer the question "How high are profits?" we must also measure them: 1) by comparison with the record of previous years, and 2) as a share of the total national income. The term "profits," as used here, refers to profits *after taxes*. These are the only profits that can be paid to stockholders or retained for use in the business.

In the first six months of 1953, corporate profits *after taxes* were at an annual rate of $20.4 billion. This was higher than in the first half of 1952, but lower than in the full years 1948 or 1950, or in the first half of 1951. If allowance is made for the declining value of the dollar, this year's net profits for all corporations represent less purchasing power than those made five or six years ago.

Here is the record of profits over the years:

	Net Profits After Taxes of All U. S. Corporations	
	Billions of Dollars	
	Actual	In 1953 Prices
1929	8.4	14.6
1939	5.0	9.8
1947	18.5	22.1
1948	20.7	22.7
1949	16.3	18.3
1950	22.7	24.6
1951	20.1	19.7
1952	18.6	18.7
1953*	20.4	20.4

*Annual rate, first six months

The record shows that real profits have a little more than doubled since 1939. This increase, however, does not mean that corporations are doing exceptionally well. The entire national income has doubled since 1939. And our industrial plant is more than twice as large as it was in 1939. Therefore, profits have just about kept pace with industrial growth.

Return on Investment

How high are profits compared with sales, or compared with the stockholders' investment?

What is the rate of return to the people who have invested their savings in corporate business?

The table below shows that for the past three years the rate of return on both sales and investment has been substantially below the return achieved in earlier postwar years. The rate of return on stockholders' investment is higher now than it was in 1939. But this is primarily because today's profits are reported in terms of today's prices, whereas much of the investment in plant facilities is still carried on the books at prewar prices, which are substantially below the cost of replacement. The current rate of return, measured as a percentage of total corporate sales, is below prewar levels.

	Corporate Profits After Taxes	
	Per Cent of Total Sales	Per Cent of Stockholders' Equity *
1929	6.1	NA
1939	4.1	4.0
1947	5.3	
1948	5.3	14.8 average
1949	4.4	
1950	5.3	
1951	4.1	11.8
1952	3.6	10.3
1953#	3.7	10.8

* Manufacturing corporations only
NA Not available
Annual rate, first six months

In considering these figures, it should be remembered that they are averages for all corporations. Some companies make more than the average, and many make no profit at all. In every year since 1915 at least 25% of all corporations have operated at a loss. In 1939, 58% of all corporations were losing money. This year the figure will probably be at least 30%. The improvement since 1939 shows a much healthier economy. But it does not indicate that profits are easy to make.

How Big a Share of the Pie?

The most important single fact about profits is that they now represent a *smaller* share of national income than they have in past years of normal prosperity. For the past three years, profits have taken a smaller share of the pie than in 1939, and considerably smaller than in the early postwar years. Here, as the chart at the beginning shows, is the record:

	Corporate Profits After Taxes as a Percentage of National Income
1929	9.6
1939	6.9
1947	9.3
1948	9.3
1949	7.5
1950	9.4
1951	7.2
1952	6.4
1953*	6.6

*Annual rate, first six months

The main reason for the declining corporate share of national income is, of course, the increasing share taken by the federal government in the form of taxes. The wage earners' share is also higher than in 1939. But the really startling increase is in federal taxes. Taxes on profits now equal almost 8% of the national income, compared to only 2% in 1939.

Why This Is Important

It is important that these facts about profits and taxes be widely understood. At its next session, Congress must consider what to do about the emergency taxes on profits enacted after the outbreak of the Korean War. The so-called excess profits tax is scheduled to die on January 1, 1954. In the absence of new legislation, the rate of the corporate income tax will drop from 52% to 47% on April 1. Many factors, including the revenue needs of the government, must enter into the decision whether or not to reduce taxes. But one fact stands out clearly: By comparison either with past years or with the total national income, corporate profits today are relatively low.

* * *

The second article in this series will discuss what corporations do with their profits.

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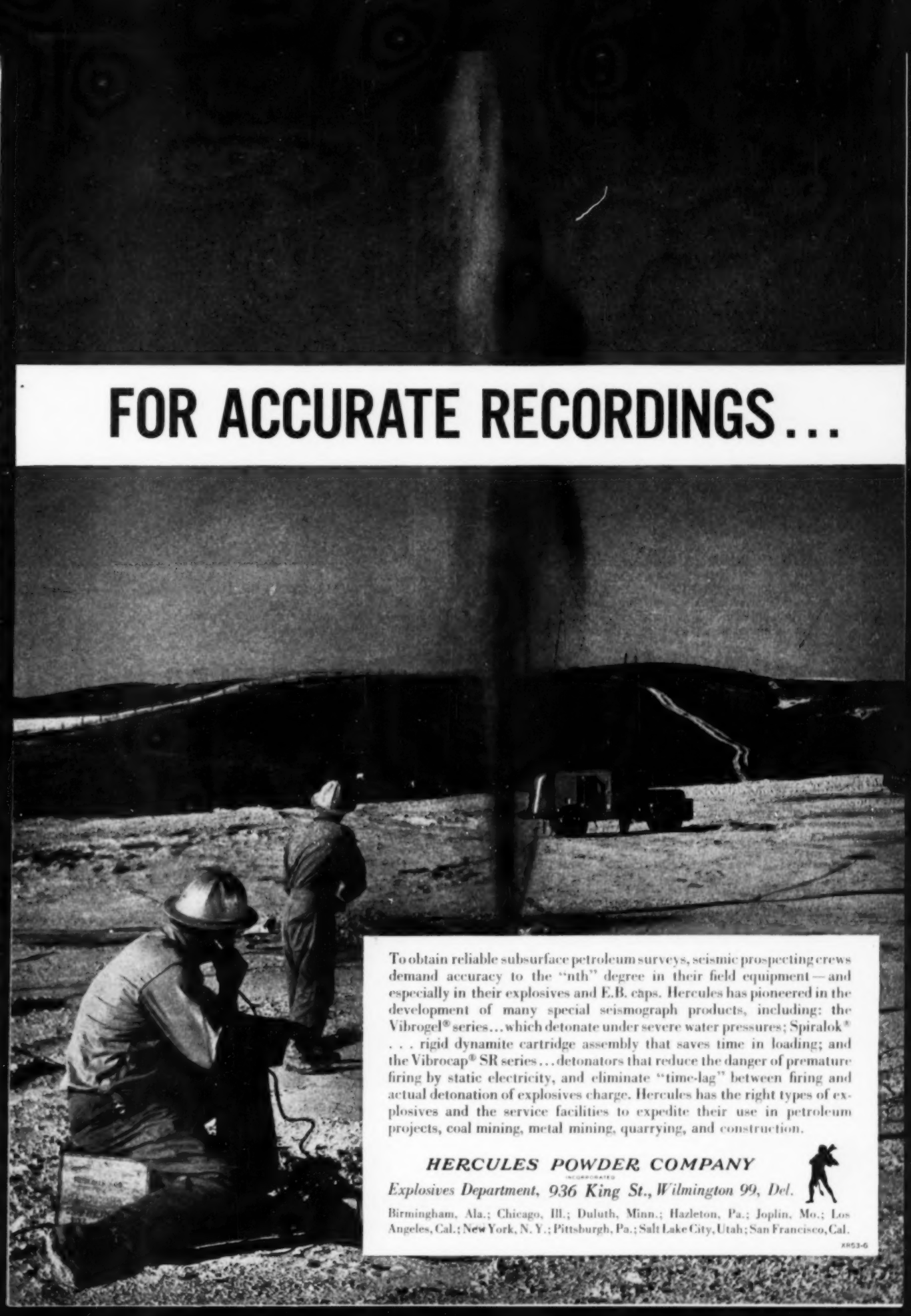

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News Round-Up

Federal Mine Safety Code Up-Dated As Forbes Stays on in USBM Top Spot

RETENTION of J. J. Forbes as director, U. S. Bureau of Mines, and revision and clarification of the Federal Mine Safety Codes covering bituminous and anthracite mines were announced early in October by Douglas McKay, Secretary of the Interior.

Mr. Forbes, a veteran of 39 yr in the Bureau, was named director by President Truman in 1951. Under President Eisenhower's administration, he has been serving as acting director. He has a little more than 2 yr to serve before reaching 70, the age for mandatory retirement. The announcement that Mr. Forbes would remain as director is reported to have followed agreement by John L. Lewis, president, UMWA, and Harry M. Moses, president, Bituminous Coal Operators' Association.

Revision of the bituminous and anthracite safety codes has been in process for some time, with representatives of the Bureau, the UMWA, BCOA and anthracite producers joining together to bring the old codes into line with current mining practices and to clarify ambiguities. The new codes have the endorsement of those groups but J. E. Moody, president, Southern Coal Producers' Association, has protested that his group was not consulted on the revisions and has said that several of the changes in the new code are not acceptable to members of the Southern group.

Federal mine inspectors will begin immediately to use the revised codes as their guide in making regular mine inspections, Mr. Forbes said.

The revised bituminous and anthracite codes are issued in two parts each, the first dealing with deep mines and the second with strip mines. Mr. Forbes explains that changes in the codes for strip mines are negligible and are aimed mostly at clarification.

J. J. FORBES, USBM DIRECTOR

Following are the major changes appearing in the code for bituminous deep mines (changes in the anthracite code follow much the same pattern):

ROOF BOLTING—Requires experimental installations of roof bolts, supplemented by conventional timbering, in rooms or back entries where travel is likely to be infrequent. After these areas have been abandoned for travel, timbers may be removed and the effectiveness of roof bolts may be observed for 2 mo. Based on these observations, minimum systematic support standards shall be determined. (The old code, promulgated in 1946 when the mines were operating under government seizure, did not mention roof-bolting.)

FACE WORKERS—Forbids any persons, except those assigned to install supports or inspect the place, to advance beyond artificially supported roof in mines where roof supports are required at the working face.

BLASTING—Requires that all explosives used underground be of the permissible type. The new code therefore sets no standards for the use of black powder.

BOOSTER FANS—Prohibits new installations of booster fans. The old code stated certain conditions under which booster fans might be used.

DUST COLLECTORS—Authorizes use of permissible dust collectors in connection with rock drilling, as well as previously approved wet-drilling methods.

ROCK - DUSTING – Prescribes rock-dusting to with 40 ft of the working face, against 80 ft in the old code.

EXPOSED CONDUCTORS – Permits trolley wires or other exposed conductors, as well as face equipment, to carry up to 650 v. This provision permits companies now equipped for such high voltages to continue using present equipment in reopened old mines or in new mines.

OTHER CHANGES—Aimed generally and specifically at reducing dangers arising from high-speed mechanical cutters and loaders, trackless haulage units and belts, and at better ventilation and more efficient removal of coal dust necessitated by faster production.

The revised anthracite code for deep mines forbids use of black powder underground and sets up new precautions for using flame safety lamps and methane detectors. It also spells out in more detail certain old sections that were ambiguous and establishes new standards to meet changed conditions.

Featured in This Section

"Business Week" Hazards Guess On What Lewis Will Demand

John L. Lewis will serve demands on the coal industry in 2 to 3 mo but formal bargaining may be postponed until after the turn of the year, according to *Business Week*, a McGraw-Hill publication. In an article published Oct. 17, speculating on Mr. Lewis' probable course, the magazine says that bargaining will be delayed "to protect the miners' Christmas earnings."

Mr. Lewis may not set his sights as high this year as in 1952, *Business Week* says. He may be content with less because: (1) miners are not building up pressure for a wage boost, being more concerned with the difficulty of main-

taining present earnings; (2) coal stockpiles are high, having risen to 77,900,000 tons at the end of August; and (3) the outlook for the national economy is somewhat clouded for the first quarter of 1954.

What would satisfy Mr. Lewis? *Business Week* believes he would be content with a 10c welfare increase and a reduction in working hours without loss of weekly pay.

But the magazine does not rule out the chance that Mr. Lewis may ask profitable companies for a big boost while letting non-profitable and marginal companies off with a smaller rise or none at all—at least for a time. The effect of this plan would be to equalize production among companies and working time among his miners.

Will the operators give Mr. Lewis what he wants? *Business Week* thinks the Southern group would fight any wage-and-welfare increase without some production-equalization plan that would give them a cost differential. Northern operators, on the other hand, might accept a shorter working day and a small welfare increase if Mr. Lewis does not press the equalization plan.

If Mr. Lewis decides to drive for a production-equalization plan, the upcoming wage talks may show a reversal of procedure in recent years, with Mr. Lewis first seeking a contract with the Southern operators and then putting it up to the North to take it—or else.

Miner Begins Extensive Tests in Anthracite

FRANCIS O. CASE, president of the Glen Alden Coal Co., and William W. Scranton, of the board of directors, view the Joy continuous miner which went into operation in the Ross vein of the Loomis colliery in mid-September as a part of Glen Alden's large-scale program to modernize its operating methods and facilities (Coal Age, October, p 135). According to first reports, preliminary results indicated that the miner cuts into anthracite much easier than had been anticipated and that wear on the cutting bits is less than expected. At times, the miner loaded a mine car in 1½ min, from the face to car, but auxiliary services must be geared to its operation before sustained performance can be realized, it was reported. Considerable testing was being planned by the company before assessing its ability to mine anthracite.

News Briefs and Trends

AEC to Build Power Plant

The Atomic Energy Commission has begun a program looking to construction by AEC of the first full-scale electric-power plant generating electricity from nuclear fission. The announcement was made Oct. 20 by Thomas E. Murray, member of AEC. The projected plant will generate a minimum of 60,000 kw. It will be built at Oak Ridge, Tenn., Paducah, Ky. or Portsmouth, Ohio, where other atomic installations already are located. Westinghouse Electric Corp. will be the principal contractor for the project. Mr. Murray declined to set a figure, but said the cost of the plant would be more than $20,000,000 and "much less" than $60,000,000. Earlier in the month, General Electric Co. had proposed that it erect a nuclear plant that would produce both electric power and plutonium, critical material for the atomic bomb. Mr. Murray said the contract is being awarded to Westinghouse because of that company's experience with the type of reactor to be used.

Meanwhile, formation of a new five-company study team, known as Nuclear Power Group, was approved last month by AEC. The five companies are American Gas & Electric Service Corp., of which Philip Sporn is president, Bechtel Corp., Commonwealth Edison Co., Pacific Gas & Electric Co. and Union Electric Co. Broad objective of the new group, Mr. Sporn said, is to explore atomic power along the economic front. First objective is to select a reactor design intended primarily for power generation. Previous studies by the five companies have comfirmed the technical feasibility of producing electricity from nuclear fission.

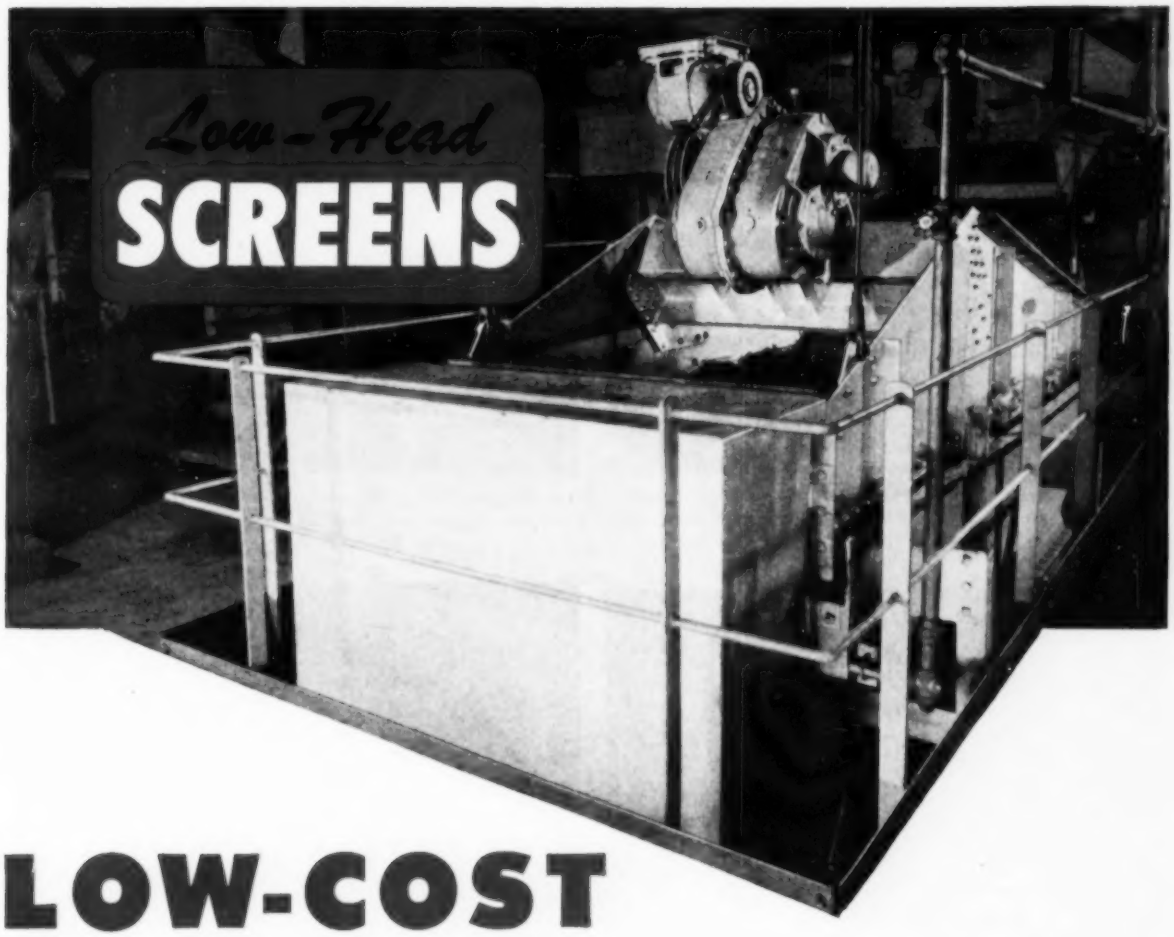
Supreme Court Denies Appeal On W. Va. Diesel Case

The U. S. Supreme Court Oct. 12 dismissed without a hearing an appeal from a decision of the Supreme Court of Appeals of West Virginia barring the use of a diesel locomotive in underground coal mines. The appeal, brought by the Pond Creek Pocahontas Co. and National Mine Service Co., followed adverse rulings in the West Virginia courts on the suit against the decision of the state Department of Mines. The state department had maintained that present law prohibited operation of the diesel underground when fueled by a product of petroleum, and previous court decisions had upheld that position, stating that the law must first be revised by the legislature before the diesel locomotive could be legally operated in coal mines. The appeal to the U. S. Supreme Court was made on the basis of the unconstitutionality of the state law but the court refused to consider it because the appeal did not contain "a substantial federal question." The locomotive, which Pond Creek purchased and seeks to use at its properties, was manufactured by National Mine Service and was the first such unit to receive Permissible Approval from the USBM.

Pittsburgh Consol Acquires National's Weirton Mine

Pittsburgh Consolidation Coal Co. announced Oct. 1 the purchase from the National Steel Corp. of that company's newly developed Weirton mine, near Morgantown, W. Va., for a consideration of $1,500,000. The property, developed to supply metallurgical coal to National Steel's Weirton mills, was designed as a completely modern operation with an eventual capacity of 1,500,000 tons annually and reportedly involved an expenditure of between $8 and $10 million. The mine was closed June 27, reportedly because of difficult operating conditions encountered. The property purchased by Pittsburgh Consol consists of 1,250 acres of surface land; about 5,200 acres of thin-vein Freeport coal which has been partially mined; the mine proper, machinery, equipment and supplies; and the above-ground plant and buildings. Pittsburgh Consol does not intend to re-open the mine. Such equipment, machinery and supplies as can be advantageously used at its other mines will be transferred to those operations, it said.

More News Briefs Begin on P 179



LOW-COST Dewatering

PITTSBURGH COAL COMPANY'S Mathies Mine preparation plant is using three 5x14 ft single deck *Low-Head* screens for secondary dewatering of 1⅛ x ⅜ washed stoker coal. Production can be varied from 160 to 270 tons per hour without appreciable change in dewatering.

The horizontal operation of these screens, together with their unique straight-line motion and built-in dewatering dams, creates the necessary voids in the coal bed to obtain free drainage for light or heavy loads.

The simple design and rugged construction of these screens pay off in low operating costs and uninterrupted performance — the reasons for low dewatering costs in any modern cleaning plant.

In addition to dewatering, this plant is using Allis-Chalmers screens for sizing raw coal and desanding refuse. No matter what your screening problems, it will pay you to get in touch with the A-C representative in your area. Call him, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 25B6280D.

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ALLIS-CHALMERS

BUILDS FOR COAL PROGRESS

MINE RESCUE **WINNERS IN ACTION** (left photo) include Verdell Caudill, Hobart Jarvis, Captain Paul Hightower, Leroy Moretz and Andrew Creech, left to right, from Wisconsin Steel mine, Benham, Ky. In right photo, Capt. Hightower receives *Coal Age* trophy from H. T. Batman.

FIRST AID **MEMORIAL COLISEUM,** Fort Wayne, houses contest among 47 top-notch teams. Winners (right photo) from Pardee & Curtin Lumber Co., Bergoo, W. Va., are Junior Coakley (left), Francis Frazee, A. E. Cutlip, Capt. George Bonovich, Ira Stidom, B. H. Cutright, Pardee & Curtin safety director.

Safety Meet Crowns Champions

THE FIRST-AID TEAM representing No. 4 mine, Pardee & Curtin Lumber Co., Bergoo, W. Va., and the mine-rescue team representing Wisconsin Steel No. 2 mine, International Harvester Co., Benham, Ky., won top honors at the biennial National First-Aid and Mine-Rescue Contest at Fort Wayne, Ind., Sept. 29-Oct. 1.

Winning out over 46 other teams in the first-aid competition and 12 other teams in the mine-rescue eliminations, the two top teams were awarded Congressional Medallions and *Coal Age* trophies. The Pardee-Curtin first-aid team also won the Mine Safety Appliances Co. trophy and the UMWA trophy. The International-Harvester team was awarded the National Coal Association trophy.

Members of the Nation's No. 1 first-aid team are: George Bonovich, captain; Junior Coakley; Francis Frazee; A. E. Cutlip; Ira Stidom, and James Stump. The champion mine-rescue team includes Paul Hightower, captain; Verdell Caudill; Hobart Jarvis; Leroy Moretz; Andrew Creech; James Rhea, and James Whited.

Runners up in the first-aid contest were teams from National Mine No. 3, in second place, led by J. Ray St. Clair, captain; and Kyle-Collier mines, in third place, led by Verner Hoover, both sponsored by United States Steel Corp., Uniontown, Pa.

Second place in mine-rescue was taken by the team from Hendrix mine, Consolidation Coal Co. (Ky.), Jenkins, Ky.; and third place by the team representing Mines Nos. 4 and 8, Eastern Coal Corp., Stone, Ky.

Winners were announced and awards presented at a banquet at the Hotel Van Orman, Fort Wayne, Oct. 1. Presentations were made by H. T. Batman, general manager and counsel, Lynch Coal Operators' Reciprocal Association, Terre Haute, Ind., toastmaster; Percy Tetlow, assistant to the president, United Mine Workers of America, Washington, D. C.; George H. Dieke, chairman of the board, Mine Safety Appliances Co., Pittsburgh; and Tom Pickett, executive vice president, National Coal Association, Washington. The contest was organized under the joint sponsorship of the Bureau of Mines, National Coal Association, UMWA and state departments of mines.

J. J. Forbes, director, USBM, was director of the meet, assisted by James Westfield, chief, Health and Safety Div., and S. H. Ash, chief, Safety Branch, USBM, Washington. Harry R. Burdelsky, coal-mine inspector, USBM, Pittsburgh, was chief judge.

Elmhurst-Chicago Stone Company Report on
J&L Jalloy Heat-Treated Plate:

"Twice the Wear ... No Downtime During Quarrying Season"

Faced with the problem of finding a long-lasting lining for their high-speed rock-crusher chutes, Elmhurst-Chicago Stone Company tried everything from rubber to high-carbon steel. Then, in 1949, J&L Jalloy Heat-Treated Plate was experimentally installed in 15% of the company chutes.

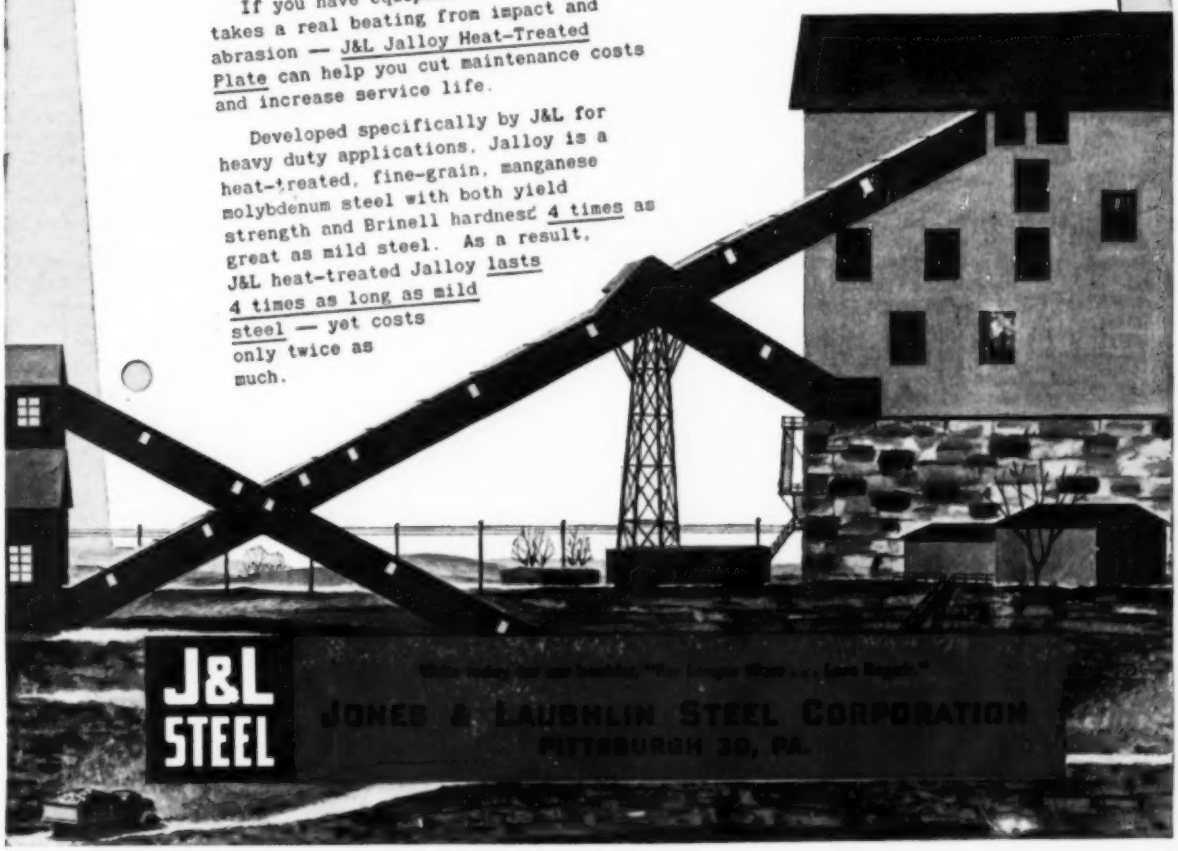
Today all worn out plates have been replaced with J&L Jalloy. Here's why. Jalloy lasted twice as long as the special abrasion-resistant steel chute liners previously used ... Jalloy lasted the entire quarrying season ... eliminated costly downtime for maintenance repairs. Finally, Elmhurst has taken further advantage of this modern J&L mining and quarrying steel by installing Jalloy liners in the company's truck beds.

If you have equipment like this that takes a real beating from impact and abrasion — J&L Jalloy Heat-Treated Plate can help you cut maintenance costs and increase service life.

Developed specifically by J&L for heavy duty applications, Jalloy is a heat-treated, fine-grain, manganese molybdenum steel with both yield strength and Brinell hardness 4 times as great as mild steel. As a result, J&L heat-treated Jalloy lasts 4 times as long as mild steel — yet costs only twice as much.

One of the roll crushers. Its high speed introduced tough impact and abrasion problems which have been solved with J&L Jalloy chute linings.

The 70-year-old quarry of Elmhurst-Chicago Stone Company.



J&L STEEL

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PITTSBURGH 30, PA.

NCA Spurs Coal Sales, Oil Curb

Merchandising and public relations operations are recast as National Coal Association seeks better sales methods—Speakers see need to guard industry's strength by limiting residual-oil imports

A NEW DRIVE TO SELL MORE COAL, a re-alignment of departments and functions in the interest of merchandising and public relations, and a firm promise to renew the fight against floods of imported residual fuel oil were high spots of the 36th annual meeting of the National Coal Association, held Oct. 20-21 at Washington, D. C.

The convention, with the highest attendance in recent years, re-elected L. C. Campbell, vice president, Eastern Gas & Fuel Associates, as the association's president, and named three new vice presidents, as follows: R. E. Jamison Jr., vice president, Jamison Coal & Coke Co.; Hugh B. Lee, president, Maumee Collieries Co.; and Walter J. Johnson, president, Sheridan-Wyoming Coal Co. Six new directors were elected to the 48-man board: C. A. Hamill, president, Sycamore Coal Co.; S. A. Kendall Jr., president, Stanley Coal Co.; Frank F. Kolbe, president, United Electric Coal Cos.; James W. Morgan, president, Ayrshire Collieries Co.; Richard T. Todhunter Jr., general manager, Barnes & Tucker Co.; and G. R. Watkins, general manager, United States Fuel Co.

"Now is the time to look ahead, not back," said E. H. Davis, chairman of the convention committee and chairman of the board, New York Coal Co., who opened the convention Tuesday morning. "The industry is not sick. It is strong in production, capacity, research and sales but it needs still more strength," he said.

CHANGING USES ADD PROBLEMS

Selling coal at a profit is the industry's big problem, according to James D. Francis, president, Powellton Coal Co., who was chairman for the Tuesday morning session. Contending that the industry will find it no harder to sell coal at a profit than at a loss, he urged cooperative selling through more regional sales agencies patterned after Appalachian Coals, Inc. Though the arts of production and preparation have been well developed, the art of selling coal has been neglected, he warned.

With the technology of mining and preparation well developed, the coal industry now is equipped to serve the Nation, said Mr. Campbell in the annual president's address. The long-term outlook is bright but changing patterns of economics and fuel use—including dieselization of the railroads, switches by householders to competing fuels and the emergence of electric utilities as coal's biggest customer—are thrusting a difficult transition period upon coal. Even so, coal remains the Nation's major source of energy, and the public and the lawmakers must be made to realize that a strong coal industry is essential to the Nation's high standard of living and its economic strength.

Mr. Campbell told the convention that coal's big customers in the future will be the electric utility, steel and chemical industries. But he also pledged the association's efforts to build up domestic and general-industry markets, speed research and curb imports of heavy fuel oil from overseas. Stressing the threat of foreign oil, Mr. Campbell warned that the coal industry must obtain a price that will provide a reasonable profit.

"The history of coal is a history of courage against tremendous odds, and while the going is rough today, it can be hoped that the industry eventually will find economic stability through its own efforts, as it has done before," said Douglas McKay, Secretary of the Interior. Mr. McKay cited the work of the Bureau of Mines in coal's behalf, pointing out that some $11.7 million—more than half of the Bureau's total appropriation for the current year—has been allocated to work on coal, including health and safety, mining and preparation methods, utilization and conversion to oil and gas. He also reviewed the studies of coal reserves now being conducted by the Geological Survey and the work of the Defense Solid Fuels Administration in World War II and the Korean conflict.

Turning to the outlook for coal's future, Mr. McKay said he believes sincerely in "the ultimate and permanent stability of the industry." But the transition is difficult and dangerous, he pointed out. Because of the growing demand for energy, the Nation cannot get along without coal and the industry's failure to prosper therefore is a cause for national concern, especially since other fuel industries are endangered when one fuel industry becomes weak.

FIGHTING OIL AND GAS

"We are preparing ourselves for the next round" in the fight to limit imports of residual fuel oil, declared Tom Pickett, NCA executive vice president. Calling for the cooperation of other industries, the public and state and federal officials on problems affecting the industry's ability to provide basic energy, he demanded that the federal government—administrative and legislative branches—"survey impartially the problem of imported residual fuel oil which is being dumped into eastern seaboard markets under subsidized circumstances at prices destructive of competition." Without remedial action, "the ultimate end will be impairment of coal's ability to produce the only source of fuel available in quantities adequate to power the Nation's industrial machine in time of emergency," he contended.

Turning to other problems confronting the industry, Mr. Pickett asked for restrictions on the use of natural gas for inferior purposes, such as steam-raising under big boilers, and for understanding by the railroads and the Interstate Commerce Commission of the industry's need for fair treatment on freight rates.

Resisting the sprawling growth of the natural gas industry is an uphill fight, reported T. J. McGrath, general counsel, Fuels Research Council, Inc. He was introduced by F. A. Fontyn, president, Ebensburg Coal Co. Mr. McGrath cited the following tangible results of his frequent appearances in coal's behalf before the Federal Power Commission:

1. Final disposition of petitions for construction of new pipelines has been delayed and the FPC has been spurred into a closer scrutiny of claims submitted with petitions.

2. Construction of pipelines, as well as sales of gas, has been prevented where they would injure coal, notably in the cases of Tennessee Valley Authority, Duke Power Co. and proposed imports from Mexico.

3. The FPC has been alerted to obscure or hidden facts related to natural gas proposals.

In addition, Mr. McGrath reported, the Fuels Research Council has fought successfully against the use of gas in the Hanford (Wash.) plant of the Atomic Energy Commission and in some instances has prevented the overloading of pipelines with gas destined for industrial boilers, brick plants and other heavy uses.

OPINION SHAPES PUBLIC POLICY

"Let us never lose sight of the fact that we cannot buy goodwill. We have to earn it," said Ralph Mulligan, NCA director of public relations. Mr. Mulligan was the opening speaker at the Tuesday afternoon session, at which L. Russell Kelce, president, Sinclair Coal Co., presided.

Citing the belief of the public that coal is unprogressive and that its workers are underpaid and underprivileged, that the industry has made little technological progress, that it has made few if any advances in safety, that its research is inadequate and unproductive and that coal combustion produces most air pollution, Mr. Mulligan ex-

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

pressed concern with what appears to be the public's indifference to this basic industry. "This indifference has carried over to questions of public policy of vital concern to the industry's ability to market its product at a price that will return the cost of production and leave a margin for improvements and for profit to the owners," he said. These questions of public policy include imports of residual oil, railroad freight rates, taxes and the distribution and use of natural gas.

"We will have accomplished much if we can obtain a far greater public awareness of its own stake in coal and why it matters whether our industry prospers," Mr. Mulligan declared. Explaining the shift in emphasis of Bituminous Coal Institute advertising from institutional to product promotion in the past 2 yr, he said that change was dictated by the competitive conditions the industry now faces. Now, he said, steps have been taken to bring all product-promotion activities under unified direction within NCA. Meanwhile, NCA's public-relations department will continue to develop greater public realization of the importance of coal to the Nation's economy and public awareness of its own stake in the maintenance of a healthy coal industry, he said.

MERCHANDISING RE-SHAPED

Realignment of product-promotion and public-relations functions of NCA, as authorized by the board of directors, was announced by R. L. Ireland, chairman, NCA Product Promotion Committee and chairman, executive committee, Pittsburgh Consolidation Coal Co. The new framework involves the following:

1. Bituminous Coal Institute is discontinued as a separate entity but holds its corporate charter. Its staff is absorbed by NCA and staff services are made available to all standing committees and departments of NCA. To preserve the publicity value of BCI, the name will continue to be used in public-relations matters. BCI funds become part of the general funds of NCA.

2. A new staff function is created within NCA to cover public relations.

3. A new standing committee of nine members, at least six of whom must be NCA directors, is set up and will be known as the Public Relations Committee.

4. Product-promotion activities hitherto carried on by BCI are transferred to a newly-created Market Promotion Committee.

5. The NCA Marketing Committee is abolished and a new committee, the Market Promotion Committee, is organized to take over all functions of the old committee, including engineering services, promotion of on-track markets (insofar as such activities do not involve direct competition between districts or individual companies) and off-track markets. In the field of off-track markets is incorporated a recently instituted campaign directed at commercial and small industrial plants. This campaign now is spearheaded, on a trial basis, by an engineering-council program in a limited territory in the Midwest.

6. The new Market Promotion Committee takes over product-promotion activities formerly carried on by BCI.

7. Liaison is continued between Bituminous Coal Research, Inc., and a subcommittee of the Market Promotion Committee.

8. The new committee assumes responsibility for collection and distribution of coal-distribution statistics and will recommend new statistical studies if those studies will strengthen product promotion.

9. The Market Promotion Committee takes over matters involving air pollution.

WINNING MARKETS FOR COAL

Reporting for the Marketing Committee, C. R. Griffith, president, Southern Coal & Coke Co., said that the engineering subcommittee and the NCA engineering department have spent most of the past 12 mo seeking to obtain for coal a larger share of the fuel market within the federal government. Soon, he said, the committee will offer recom-

(Continued on page 194)

Exporters See Steady Shipments Ahead

PREDICTIONS of 1953 shipments totaling 14,500,000 tons of United States coal to offshore destinations, with some 8,000,000 tons going to Europe, plus pleas that American coals be permitted to compete freely in world markets marked the annual meeting of the Coal Exporters' Association of the United States, Oct. 19, at Washington, D. C.

All officers were re-elected. Ray Maust, president, Saljoan Coal Co., New York City, was elected a new director.

The outlook is good for a continuing export market for United States coals, according to William M. Rand, deputy director, Foreign Operations Administration. Speaking at the luncheon meeting, he expressed "limited optimism" as to preservation of competition in the international coal trade. He based this optimism on a recent decision of the High Authority of the European Coal & Steel Community, which rejected proposals to issue import licenses and restrict dollar exchange.

Predicting exports of 8,000,000 tons of U. S. coal to Europe by the end of 1953, Mr. Rand said that the prospect for currency convertibility and the recent emergence of Greece as a buyer of American coal, with Scandinavian nations possibly preparing to follow Greece, are added reasons for confidence in the export market.

S. Pemberton Hutchinson, association president and executive vice president, General Coal Co., Philadelphia, warned the exporters that some European nations now are considering issuance of import licenses for United States coals and therefore urged members to guard against such moves. Countering recent press reports, he said that the American coal industry has the ability and aptitude to provide coal for export, that American coals are cheaper and of higher quality than European coals and that the availability of American dollars in some European nations, together with currency "switch" deals in those countries where dollars are not plentiful, now makes trading easier than in recent years. "Where our coal fits into their economy and we have willing buyers, we want to be free to do business," Mr. Hutchinson said.

Off-shore exports will total about 14,500,000 tons in 1953, according to F. F. Estes, the association's executive secretary. Exports to Canada will amount to 24,000,000 tons for a grand total of 38,500,000 tons, he said. "There is nothing on the horizon that might be expected to drop monthly average shipments below their present level for quite some time to come," he reported.

Sizable tonnages will go to Korea, Europe, South America and Asia, especially if genuine reciprocal trade is permitted to flourish without artificial restrictions, he predicted.

Reviewing briefly the work of the association since its last meeting, Mr. Estes reported on the lifting of export restrictions on coke, the failure to win freight-rate concessions on rail-shipped coal destined for export and the maintenance of close contact with the Foreign Operations Administration, especially in opposing the merger of the F.O.A. coal branch with the steel branch.

"If the free people of the world are to defend themselves, or if there is to be an increase in the standard of living, more coal will be required," said J. W Haley, treasurer and general counsel of the association and vice president, Jewell Ridge Coal Corp., Washington. Citing the high productivity of the American coal industry, he said, "The American coal industry is in a preeminent position to provide additional coal for our friends and allies across the seas."

Coal exporters will not jeopardize the efforts of other groups to curb imports of "dump" foreign residual oil, said D. T. Buckley, chairman of the association's Government Relations Committee and assistant to the president, Castner, Curran & Bullitt, Inc., New York City. But the association does ask the right to move coal anywhere in the world, without restriction, as long as that coal is needed, is of good quality and is competitively priced, he said. Denying press reports that American coal exporters are being subsidized with taxpayers' dollars, he explained that some 80% of coal exports have been financed with free dollars available in the countries to which coal has been shipped.

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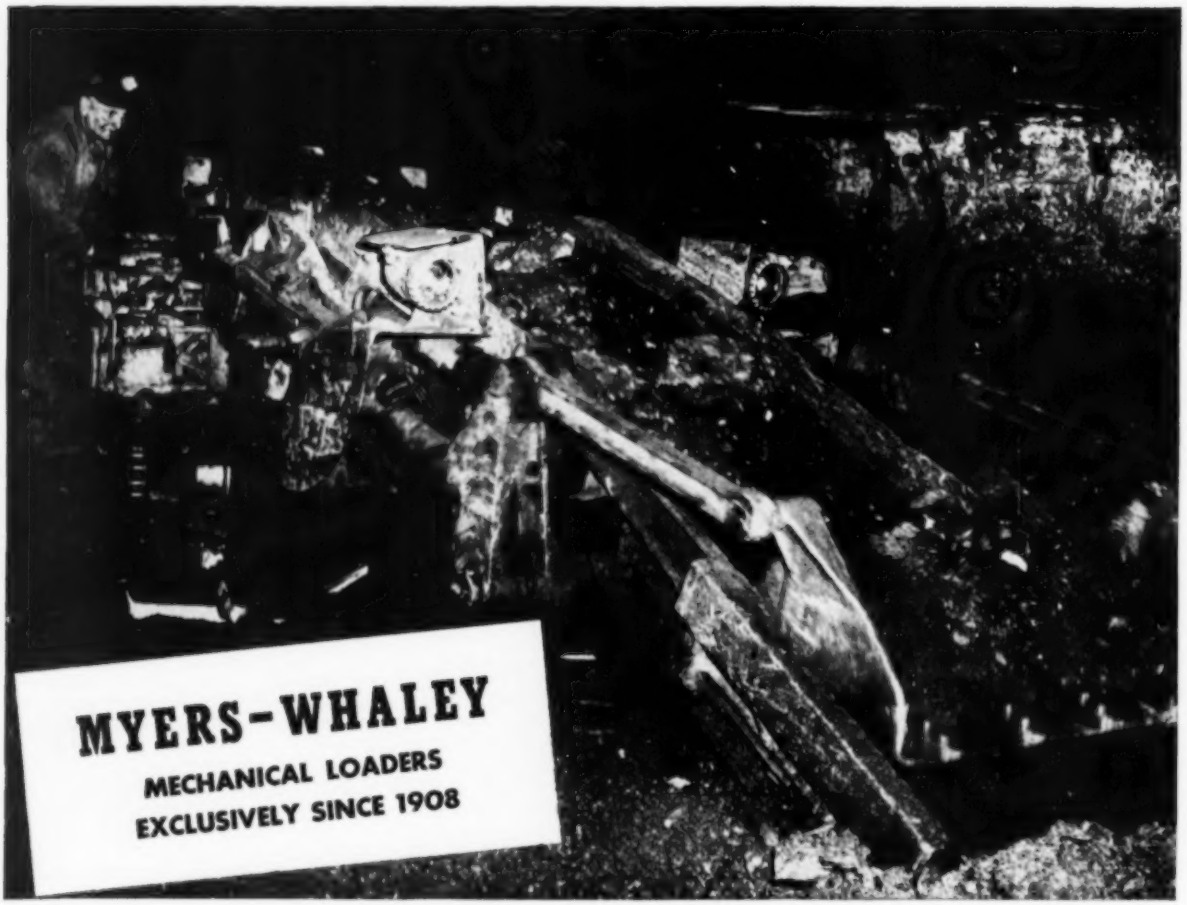

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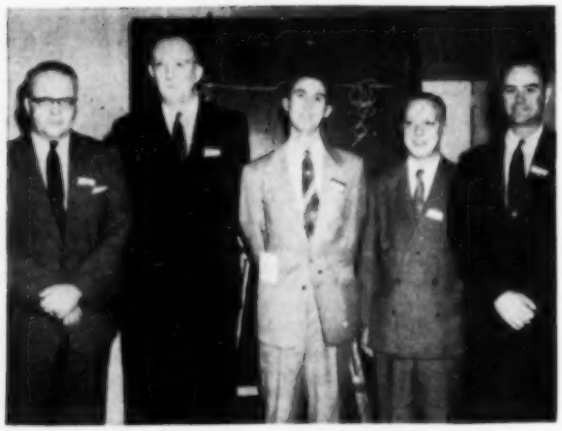
FUNCTIONAL POWER, breaker settings, grounding and cleaning-plant power—R. B. Moore (seated), session chairman; H. P. Musser (left), W. R. Morton, Donald J. Baker, C. L. Brown and L. H. Harrison.



TRANSFORMERS, eddy-current slope-belt drive, continuous-miner power and electric braking—R. M. Hunter (left), Ralph R. Richart, R. L. Schwab, A. H. Huelsman and R. B. Moore, session chairman.

AIEE Scans Electrical Progress

New equipment, new methods and new uses for electric power in coal mining highlight biggest meeting of mining-electrical experts in East as Middle Eastern District gathers at Charleston, W. Va.

FAVORABLE EXPERIENCE with a 1,500-hp synchronous motor-eddy current coupling drive for a slope belt, a 2-motor AC arrangement to drive and brake a mine hoist, power requirements for various mining functions, and tables for quickly determining settings of DC breakers—these were among the new or outstanding features brought out in papers presented at the Charleston, W. Va., meeting of the Middle Eastern District, American Institute of Electrical Engineers, Sept. 29-Oct. 1.

At the four sessions, which were devoted exclusively to mining, the 16 papers included the following additional subjects: preparation-plant power aspects, grounding, the continuous miner developed by Carbide & Carbon Chemicals Co., power supply for continuous miners, mining transformers, electric braking methods for AC hoists, the track-laying shuttle car, a 15-ton low-height locomotive, DC substation location and equipment, paralleling DC substation units, neoprene cables and trailing cables.

At the meeting, which was said to be the largest in the history of top mining-electrical men of the eastern part of the country, R. B. Moore, manager, Mining-Industrial Divisions, General Electric Co., Schenectady, N. Y., and chairman of the Eastern Mining Subcommittee of AIEE, was chairman of two of the sessions. C. O. Wood, chief electrical engineer, Goodman Mfg. Co., and secretary of the Eastern Mining Subcommittee, was chairman of a third session and L. H. Harrison, U. S. Bureau of Mines, Birmingham, Ala., was chairman of the fourth session. A. C. Muir, electrical engineer, Berwind-White Coal Mining Co., Philadelphia, and chairman of the General Committee on the Mining and Metal Industry, was present at the meeting.

MOTOR FOR A LONG SLOPE BELT

R. R. Richart, electrical engineer, Chicago, Wilmington & Franklin Coal Co., Benton, Ill., described the 1,500-hp synchronous motor-eddy current coupling drive on the company's 42-in belt conveyor, 3,300 ft long on a 16-deg slope, single lift (868 ft), at Orient No. 3 mine, which has been in operation for 3 yr. The synchronous motor was made by General Electric and the coupling by the Dynamatic Corp., subsidiary of Eaton Mfg. Co. In this coupling, variable DC excites the inside rotor connected to the load, thus producing eddy currents in a surrounding steel drum connected to the motor and operated at constant speed and thus, in turn, causing torque through the air gap and a rotation of the inside rotor and load. Heat caused by slip losses is carried away by water spraying onto the back end of the drum and through holes in it and into the air gap. By electronic control, speed of the output shaft can be varied from zero to 870 rpm.

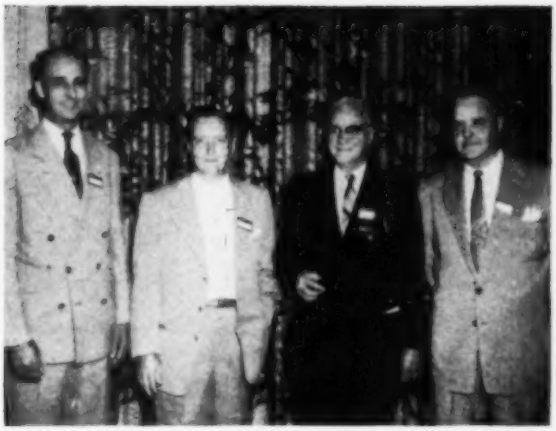
A smooth clutching or engaging action is produced for starting the belt, thus reducing high peaks in motor demand, since the synchronous motor already is up to speed. It is started across the line before starting the other motors of the cleaning plant. The 1,500-hp synchronous motor (rated 0.8 pf) compensates for two-thirds of the lagging kvar required by induction motors in the preparation plant. It can deliver 900 kvar at full load and 1,080 kvar at half load.

A 10-cylinder 1,600-hp diesel engine already on hand is to be connected to the synchronous motor via an Airflex coupling so that the motor can be used in an emergency as a generator to supply enough power to ventilate the mine and operate the man-shaft elevator. Answering a question about power factor and underground load, Mr. Richart said that the 48-in main underground conveyor now is 4,800 ft long and there are five 500-kw G.E. ignitron rectifiers 680 ft apart at the mouths of panels along this main entry.

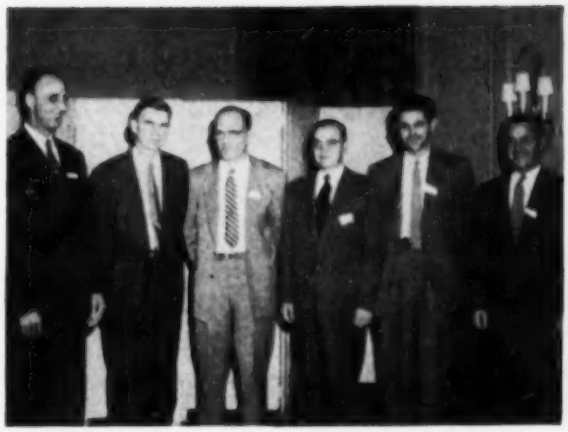
INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

DRIVING AND BRAKING A HOIST

A. M. Myles, Electric Controller & Mfg. Co., Cleveland, described a mine hoist with two 200-hp wound-rotor induction motors fitted with controls so both motors drive during hoisting. Each supplies half the torque, or one can be reversed to provide slow-down and landing-speed control. The arrangement also can supply slow speed (100 fpm) for cable and shaft inspection. The use of two motors has other advantages, namely: reduced inertia (WR2) and insurance of greater continuity of service because the controls and clutching drums allow using only one motor when the other motor has failed.



CONVERSION EQUIPMENT and location, parallel operation of conversion units and a 15-ton low-height locomotive—J. W. Brauns (left), J. A. Dunn, L. W. Scott and C. O. Wood, session chairman.



TRACK-LAYING SHUTTLE CAR, mining cables, new continuous miner and two-motor hoist control—J. W. Brauns (left), J. W. Heimeister, A. H. Myles, T. R. Weichel, Steve Bunish and L. H. Harrison, chairman.

HOW MUCH POWER FOR MINING?

In his paper, "Characteristic Power Requirements for Performing Various Functions in Underground Coal Mines," H. P. Musser, president, West Virginia Engineering Co., said demand and energy requirements of mining machines do not vary very closely with rated horsepower. For instance, according to a table he submitted, a 35-hp machine created an average demand of 27.16 kw, while with a 75-hp unit it was 41.47 kw.

Numerous tests on machines of different ratings in a variety of seams substantiate a generalization that about 50 watt-hours is consumed per square foot of kerf. Half-used or worn-out bits do not greatly increase the demand but the slower cutting can double the watt-hours used per square foot. Bits of different types cause little change in demand but a suitable type can cut at about half the watt-hours per square foot required by a less suitable type.

Many tests over the years show that loading machines require 0.35 to 0.5 kw-hr per ton and that the energy consumption does not vary directly with the horsepower rating. Test data on three types of loading machines showed the connected horsepower, average kw demand and kilowatt-hours per ton as follows: No. 1 type: 20, 10 and 0.423; No. 2 type: 25, 20 and 0.405; No. 3 type: 50, 12 and 0.364.

Energy per ton of coal consumed for gathering by any method usually is in the range of 0.25 to 0.5 kw-hr. Tests on two chain conveyors showed the demands to operate the conveyors empty to be 56.5% and 70% of the demands when loaded. Tests on 60-hp. locomotives under two conditions— (1) motors in series with a speed rating of 3 mph and (2) motors in parallel with speed rating of 6 mph—showed tons gathered, total kw-hr and kw-hr per ton as follows: (1) 176.3 tons, 54.2 and 0.307 kw-hr; (2) 154.8 tons, 108.2 and 0.698 kw-hr.

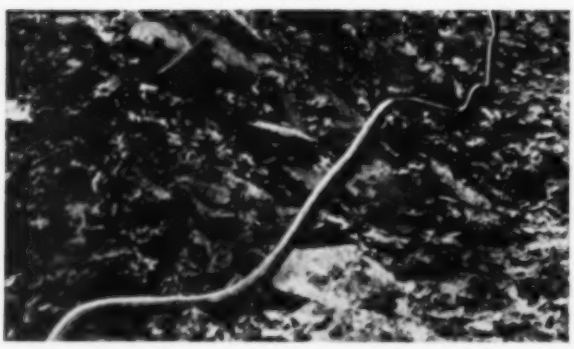
Tests on a hand-loading conveyor section having equipment totaling 197 connected horsepower showed a 15-min demand of 44 kw, a momentary demand peak of 82.5 kw and an energy consumption of 0.79 kw-hr per ton for all functions to mine and deliver the coal to the main haulage.

Tests on a main haul with two locomotives, one pulling and one pushing, with total rated horsepower of 276 and with 45 tons of coal to be handled—first on a 3,000-ft pull over a 3.83% grade and second on a 5,000-ft pull over a 3.20% grade—revealed the following data on momentary kw, average demand in kw, total energy in kw-hr and energy in kw-hr per ton: first, 316, 211, 14.13 and 0.314; second, 267, 196, 23.28 and 0.57.

Belts, like chain conveyors, have a high friction load. Tests on two belts (grade not stated, so presumably level) showed one heavily loaded unit taking 65 kw and dropping to 37.5 kw without load, while the other belt carrying a smaller tonnage drew 45.6 kw, then dropped to 36 kw without load.

(*Continued on p 210*)

EASTERN MINING SUBCOMMITTEE LUNCHEON—Seated: J. H. Edwards (left), Coal Age, Huntington, W. Va.; L. H. Harrison, USBM, Birmingham, Ala.; F. R. Hugus, Joy Mfg. Co., Franklin, Pa.; R. B. Moore, General Electric Co., Schenectady, N. Y.; C. O. Wood, Goodman Mfg Co., Chicago; J. Z. Linsenmeyer, Westinghouse Electric Corp., East Pittsburgh; and H. B. Buckingham and J. E. Breth, T. C. I. Div., U. S. Steel Corp., Fairfield, Ala. Standing: D. A. Haley (left), Jamison Coal & Coke Co., Fairmont, W. Va.; E. J. Gleim, USBM, Pittsburgh; J. A. Dunn, Island Creek Coal Co., Holden, W. Va.; R. R. Richart, Chicago, Wilmington & Franklin Coal Co., Benton, Ill.; A. C. Muir, Berwind-White Coal Mining Co., Philadelphia; Lanier Greer, Reliance Electric & Engineering Co., Cleveland; G. F. Johnson, Joy Mfg. Co., Michigan City, Ind.; J. S. Buss, Reliance Electric & Engineering Co.; and O. J. Swanson, U. S. Steel Corp., Gary, W. Va.



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FIRST CONCILIATORS—Original members of the Anthracite Board of Conciliation were: Seated, R. C. Luther (left), Philadelphia & Reading Coal & Iron Co.; W. L. Connell, board chairman and operator member; Thomas D. Nicholls, board secretary and president, UMWA District 1; standing, S. D. Warriner (left), Lehigh Navigation Coal Co.; W. H. Dettrey, president, UMWA District 7; and John Fahy, president, UMWA District 9.

TODAY'S BOARD—Seated, Michael J. Kosic (left), secretary of the board; G. A. Roos, Philadelphia & Reading Coal & Iron Co., and board chairman; Evan Evans, Lehigh Navigation Coal Co.; standing, Mart F. Brennan (left), president, UMWA District 7, now rounding out 23 yr on the board; Edgar C. Weichel, The Hudson Coal Co.; J. T. Kershetsky, president, UMWA District 9; and August J. Lippi, president, UMWA District 1.

Anthracite Board Marks Golden Jubilee

BACKWARD GLANCES AT ACHIEVEMENTS in labor-management peace and pledges of teamwork to maintain harmony in the future marked celebration Oct. 1 of the 50th anniversary of the Anthracite Board of Conciliation as nearly 1,500 management men, UMWA officials and mineworkers converged on Lakewood Park, Pa., to hail the board and hear major speeches by J. B. Warriner, senior director, Lehigh Navigation Coal Co., and John L. Lewis, UMWA president. John J. Forbes, director, U. S. Bureau of Mines, also spoke briefly. Thomas Kennedy, UMWA vice president, was toastmaster.

The board, the oldest industry-wide arbitration agency in the Nation, was formed in 1903 in line with recommendations of the Anthracite Strike Commission, named by President Theodore Roosevelt following a stoppage that paralyzed anthracite operations for 165 days in 1902. Since then, the board has been asked to rule on 7,080 grievances, 6,678 of which were filed by miners and 402 by operators. Nearly half of the total cases have been withdrawn or settled without adjudication by the board or the umpire. In the last 27 yr of the board's existence, the industry had lost only 25 days of working time chargeable to authorized strikes.

"The board's success has been due in large part, I think, to the goodwill and earnest effort of those who have composed its membership over the years," Mr. Warriner said. "Each side has fought aggressively for its own contentions but always in a friendly and courteous manner. I cannot remember when personal antagonism was injected into our proceedings," he said. Calling past and present members and umpires by name, he attributed the long life and success of the board to the honesty and earnestness of these men.

Mr. Warriner served as an operator representative on the board for 25 yr before his retirement in 1951.

Mr. Lewis told the gathering that much of the achievement of the board arose from service by top men in the industry who had the influence and the authority to make their decisions effective. "I should personally deplore the day, if it ever comes, when there would be a tendency in the industry for either side to lessen their individual responsibility by sending in to the board men without the authority to make their decisions effective," he said.

Peaceful relations between miners and operators indicate that stability and maturity are possible in labor-management relations and that differences can be settled without resort to economic force, Mr. Lewis said.

Turning to problems of mining, marketing, transportation and cost facing the industry, Mr. Lewis declared that the UMWA is eager to do its part in finding the answers, "not only for the material advantage that comes to the individual with an assured income that permits him to live as an American, but in order to bring to the investors of the industry that proper participation upon the capital which they invest, and to help maintain the free enterprise system and our manner of living in America, and to help preserve the integrity of our republic."

Mr. Lewis warned, however, that the

Mr. Lewis Speaks His Mind

In his address marking the Golden Jubilee of the Anthracite Board of Conciliation, John L. Lewis, UMWA president, stated his position on some of the problems facing the industry. The following are direct quotes of statements made in his speech:

Wage Standards—"The men who work in the mines cannot be held to accountability by reason of a curtailment of the usage of the product."

Productivity—"I want to call the special attention of members of the UMWA to the continuing necessity of doing everything possible to increase the per-man daily output of this commodity."

Work Practices and Rules—"From time to time, UMWA international and district officers have called the attention of the anthracite membership to the necessity of increasing production and the necessity of abandoning and curtailing practices and rules that in themselves do nothing but add cost to the production of coal and increase the problems of the operating companies in meeting their competition. I urge that our membership seriously consider the problems inherent in those things."

Return on Investment—"We also say that those who have invested to create this industry, who pay to manage this industry, are entitled to a return in the American way upon their investment."

Machine Mining—"I'm all for the machine doing the work. I'm all for the utilization of power to do the work of human hands."

The Source of Better Living—"The only way that any increase in the standard of living can take place here in our free America is to have those increases paid for out of the values created by new efficiencies and the ability of the producer to market a greater volume from the work of one man."

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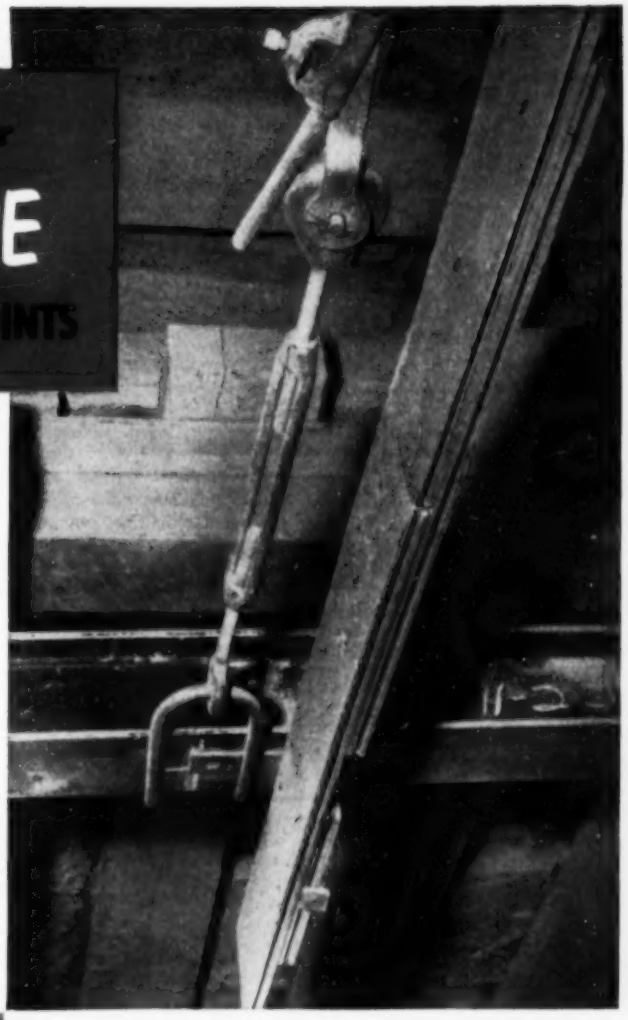

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mineworkers will not accept a reduction in their standard of living when taxes, transportation and other costs imposed "after the coal leaves the mine and the tipple" force prices up and cause markets to shrink. "The lowering of the living standards of the men in the coal industry—and this is true whether it is bituminous or anthracite—is not the answer inherent in our concept of future economic America," he declared.

Mr. Forbes, briefly reviewing his 39-yr career in coal-mine safety, praised the industry as a close-knit association of miners and mine owners and cited the board as evidence of that association.

Moody Warns Against Loose Welfare Funds

Unwise pensions and welfare funds, not geared to actuarial facts or the ability of an industry to pay, will cause friction, hardship and even economic disruption to the industry or company concerned, says Joseph E. Moody, president, Southern Coal Producers' Association. Mr. Moody sounded his warning in an address Oct. 8 before the Fall Industrial Relations Conference, meeting at Cleveland, Ohio.

Sensible pension and welfare plans, on the other hand, properly funded to guarantee the income they are intended to produce and tailored to the earning capacity of the industry, can create good labor relations and add to the Nation's economic stability, Mr. Moody declared.

Mr. Moody told his audience that although the UMWA welfare and pension violated the principles he urged, he would advise companies and industries setting up such plans in the future to act as follows:

1. Insist that the fund be actuarily sound.

2. Create a fund that anticipates reasonable payments related to earnings, business stability and prospective markets.

3. Guard against surrendering complete control of the fund's dispensation to union leadership.

4. Keep the welfare and pension agreement separate from periodic negotiations over wages and other union demands.

5. Limit the employer-paid benefits to sickness or injury directly derived from service in the industry. For other benefits, establish a participating plan if mutually agreed upon.

Miller Rejoins Mexican Firm

E. F. Miller, above, vice president, Westmoreland Coal Co., Madison, W. Va,. since May, 1952, has resigned to return to the Cia. Carbonifera de Sabinas S. A. at Rosita, Coahuila, Mexico, a subsidiary of American Smelting & Refining Co., as assistant manager of the company. In his new position, he will manage four coal mines producing approximately 80% of Mexico's by-product coal. Mr. Miller, who was with the ASF Mexican subsidiary from 1947 to 1952, is returning to Mexico primarily because of the favorable climate for Mrs. Miller's health. Previously he was associated with Eastern Gas & Fuel Associates as general superintendent of the Federal Div.

Personal Notes

Lee Retires From Peabody

Carl Lee, chief engineer, Peabody Coal Co., Chicago, retired last month after 40 yr with the company. In making the announcement, Mr. Lee, who will continue as a consultant for the company, wrote friends and associates as follows:

To My Business Associates and Friends:

The 40 yr that I have spent with Peabody Coal Co. has been an era of tremendous changes in the tools for and procedures of mining coal.

My principal interest has been in the design, engineering and application of more efficient labor saving devices. When I first visited some of our mines the shearing, undercutting or snubbing was done by pick work wielded in the strong arms of the miner. Loading was done by hand. Today . . . machines cut and load simultaneously without the use of explosives. Many other improvements toward efficiency and safety have been made.

During these years I have had the pleasure of meeting and working with numerous outstanding men of the industry. In addition to pleasant business relationships, many close and lasting personal friendships have been formed.

Now, after these many years, the time has come for me to ease out of active participation in the strenuous problems involved in this highly competitive industry. Effective Oct. 1, 1953, I expect to be at leisure at my home, 9849 S. Hoyne Ave., Chicago 43, Ill.

Carl Lee (signed)

Susquehanna Collieries Div. of the M. A. Hanna Co., Nanticoke, Pa., has announced the promotion of **W. H. Moore,** superintendent, Glen Lyon colliery, to general superintendent of mines for the division. **Michael F. Farrell,** assistant superintendent, No. 7 colliery section, has been promoted to superintendent of Glen Lyon colliery, succeeding Mr. Moore.

The Hudson Coal Co., Scranton, Pa., has announced several changes in its supervisory personnel. **Ralph W. Smith,** assistant superintendent, Pine Ridge colliery, has been transferred to Eddy Creek colliery in a similar position. Mr. Smith succeeds **William W. Martin,** who has been advanced to superintendent of the Loree colliery, replacing **Robert M. Von Storch** who recently joined the U. S. Steel Co. in Utah. **John A. Williams** has been promoted to mine foreman at Delaware colliery, succeeding **William Roth,** who resigned to enter another industry. Mr. Williams, formerly Northern Div. rock foreman, has been succeeded by **James Nixon,** Grassy Island section foreman.

J. H. Johnson, superintendent of mechanical maintenance and construction, The Hudson Coal Co., Scranton, Pa., has retired. Born in Sweden, he came to the U. S. at an early age and when 10 yr old, started work as a slate picker in the Baltimore Tunnel breaker. After 2 yr he left Hudson Coal Co., rejoining the firm in 1915 to take charge of breaker construction and remodeling. During his service to the company, he remodeled every breaker on the property, and in 1919 built Loree Breaker in 190 days, thought to be a world's record.

C. S. Mulvaney, assistant chief engineer, Peabody Coal Co., Chicago, has been named chief engineer, succeeding **Carl Lee,** retired. **S. Lloyd Anderson,** southern division superintendent at Marion, Ill., for the past 7 yr, has retired after having served Peabody for 32 yr. Other personnel changes announced by the company include the promotion of **Coil Whitlow** to superintendent of Mine 14, succeeding **John Kelly,** who recently resigned. **Tony Shimkus** and **Keith McCann** have been named assistant field superintendents under **Joe Craggs,** recently advanced to field superintendent of operations. Other assistants to the field division superintendent are: **G. L. Morris,** division engineer; **Jim Young,** division mechanic; **Bill Haywood,** division belt maintenance supervisor; **Fred Becker,** division electrician, and **L. H. Johnson,** safety engineer. **Luther Stodghill** has been named assistant maintenance supervisor of coal preparation plants.

Eastern Gas & Fuel Associates have announced the retirements of two Coal Div. supervisors. **William W. Hunter,** with the company for 25 yr, was named superintendent of Stotesbury No. 8 mine

(*Continued on p 176*)

H-1 Bottom Terminal. Set screws hold cable end in place

H-3 Bottom Terminal. Bolt tightens against washer which bears against looped cable end

H-2 Bottom Terminal. Cam swings down onto bare cable end and wedges it securely

O-B Tap Terminals

Grip Cable Tight and Stay Tight

Forget about pull-out troubles! Any of these three terminals - with set screws, with a locking cam, or with a hold-down washer - gives high holding strength. Each makes excellent electrical contact with both cable and fuse; thus there is no overheating or oxidation causing a terminal to relax its grip on trailing cable. Terminals that clamp cable tightly - and stay tight after repeated use - prevent pull-out delays, and keep machinery running.

These are the strongest cable-gripping terminals made for use in fused taps. Let them work for you in O-B Form-H and Form-J Fused Taps!

Ohio Brass

MANSFIELD OHIO, U. S. A.

4348-M

SPEAKERS, OFFICERS—V. D. Hanson (left), mechanical engineer, Pittsburgh Coal Co.; A. Lee Barrett, development and research engineer, Joy Mfg. Co.; A. E. Molinski, session chairman, supervisor of maintenance, Bethlehem Mines Corp.; W. D. Walker, Jr., chief, Pittsburgh Branch, Accident Prevention and Health Division, USBM; D. C. Jones, director, extension services, School of Mineral Industries, Pennsylvania State College; secretary-treasurer, C. L. Brown, electrical engineer, USBM; president, F. J. Bucher, electrical engineer, Hillman Coal & Coke Co.; vice-president, W. R. Wood, electrical superintendent, The Berwind-White Coal Mining Co.

Electro-Mechanical Group Holds First Meet

MINE MAINTENANCE as related to safety and inspection; manufacturing and research; and operations and maintenance men were the topics at the first annual meeting and banquet of the Mining Electro-Mechanical Maintenance Association, held at the Penn-Lincoln Hotel, Wilkinsburg, Pa., Oct. 10. Over 125 members from seven branches attended the technical session and banquet, marking another forward step in growth for the organization which was formed in June, 1948.

Speaker at the banquet was Harry Stuhldreher, assistant to the vice president, U. S. Steel Corp., well known football coach and quarterback of Notre Dame's famous "Four Horsemen."

Officers for the current year are: president, F. J. Bucher, electrical engineer, Hillman Coal & Coke Co.; vice president, W. R. Wood, electrical superintendent, The Berwind-White Coal Mining Co.; secretary-treasurer, C. L. Brown, electrical engineer, USBM.

The following speakers discussed mine maintenance in relation to the subjects noted: W. Dan Walker, Jr., chief, Pittsburgh Branch, Accident Prevention & Health Div., USBM, "Safety and Inspection"; A. Lee Barrett, development and research engineer, Joy Mfg. Co., "Manufacturing and Research"; and V. D. Hanson, mechanical engineer, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., "Operations and Maintenance Men." Opening speaker at the session was D. C. Jones, director extension services, School of Mineral Industries, Pennsylvania State College, who discussed "Five Years of ME-MMA."

The welcome address was given by F. J. Bucher, president of the association. Chairman of the technical session was A. E. Molinski, supervisor of maintenance, Bethlehem Mines Corp.

Five Years of Me-Mma

The idea of an institute for mine maintenance developed at a chance meeting at the USBM in December, 1947, of a group of mining men interested in mine-maintenance problems, Mr. Jones said. A growing need for assistance in mine-maintenance problems was largely responsible for proposing to the Coal Mining Institute of America in December, 1947, that a mechanical-electrical section be developed to attract mine-maintenance men and hold meetings devoted specifically to maintenance problems.

A separate organization was suggested as being preferable and, as a result, the ME-MMA was born. The association was formed with a control group and a branch chapter in each area to be served.

The first branch chapter was established in September, 1948, and was named Allegheny-Valley. Other branches established since then are: Greene County, Johnstown, Barnesboro, Fairmont, Morgantown, Ohio-Valley, and Mon-Valley. From membership numbering in the tens, the association has grown to almost 1,000.

In 1949, there were 21 programs available covering the following topics: operation and maintenance of motors, hazards resulting from improper maintenance, permissible equipment, trailing cables and trolley taps, lubrication, electrical insulation, hydraulic systems, equipment controls, mine fans, rectifiers and mine sectionalizing equipment. At present there are 47 such programs available, Mr. Jones added.

Looking to the future, Mr. Jones reported that consideration is being given to a proposal to establish in cooperation with mining men in West Virginia a sister council which would function similarly to the original group. If the proposal becomes an actuality, it will mean the first step has been taken in having The Mining Electro-Mechanical Maintenance Association become the mine-maintenance association of this country, Mr. Jones added.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

Safety and Inspection

The entire problem of maintenance is closely interwoven with safety, Mr. Walker declared, in pointing out the relation between maintenance, safety and inspection. The U. S. Bureau of Mines is concerned with maintenance only so long as it affects the health of the worker. It is necessary to find a common ground to formulate a program for the whole industry, he added.

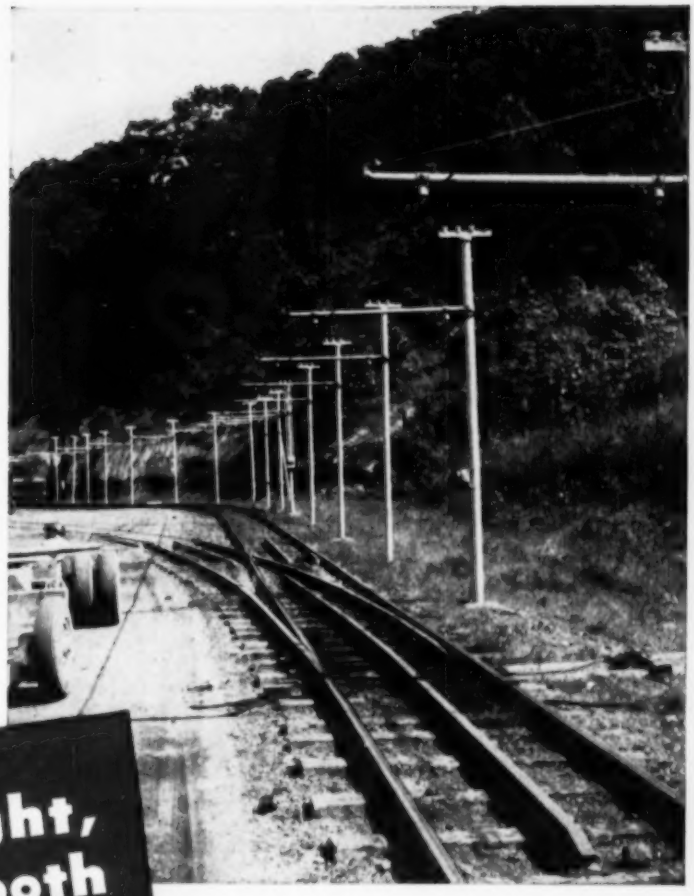
The electro-mechanical section in the USBM is concerned with the development of electrical equipment for underground use. It always approaches any problem from the safety angle and the Bureau is guided by its work.

Since federal coal-mine inspectors can't be experts in a phase of mining, they are guided by rules and procedures, and any deviations are handled by specialists, Mr. Walker added. An attempt is made to investigate and consider any special problems and solve them as quickly as possible.

Original USBM requirements to main-

(Continued on p 208)

This kind of OVERHEAD Lets Trips Move FAST!



....it's straight, level and smooth

Fittings for use on pipe for overhead supports like this are shown in the O-B No. 27 Catalog. Check it for materials used on wood, steel, or roof, also.

Current collectors skim smoothly along a trolley wire like the one shown above! They hug a wire that's level and straight, and motormen know they can move fast when collectors act that way. You can have this kind of overhead-easily-throughout your haulage system; inside and out. With O-B Trolley and Feeder Materials, you can build it on any kind of support structure - on pipe, on timbering or on I-beams, or fasten it right to the roof. O-B hangers, adapters, and expansion bolts for use on all these supports let you hang O-B Smooth Underrun Trolley Materials wherever track is laid.

"Straight, level and smooth" describes the overhead you want for fast haulage. Build it anywhere with O-B Smooth Underrun Trolley Materials.

Ohio Brass

MANSFIELD OHIO, U. S. A.

4340-M

Stonega Mines Complete 100% Training

AT CEREMONIES held in Derby, Va., Oct. 3, the Stonega Coke & Coal Co. feted employees, supervisors and local union officials of its Crossbrook and Derby collieries for 100% completion of the USBM course in accident prevention. Shown here with T. J. Liddle, company safety engineer, looking on, is the presentation of the Bureau's certificate for Crossbrook to B. M. Neel, assistant general superintendent, by J. B. Benson, chief of the Bureau's Norton Branch. Mr. Benson also presented a certificate to E. N. Strang, superintendent, Derby colliery. Presidents of the two local unions received Bureau certificates from J. B. Yanity and J. S. Malesky, USBM, and UMWA Certificates from Robert Condra, international representative, and Allen Condra, District 28 president. Mr. Liddle served as master of ceremonies and H. W. Meador, company vice president, made the welcoming address.

Tops at 19th Coal River Institute Meet

FIRST AID WINNER at the 19th Annual Safety Meet of the Coal River Mining Institute held at Whitesville, W. Va., in September was this team from the Nellis No. 3 mine of the Armco Steel Corp., which scored 1,493 points out of a possible 1,500 to top the nine-team competition. Team members are: Marion Sutphin (left), captain; Okey DeRaimo, Rattis Holstin, James Rust, Howard Gobble, Kenneth Justice and Pete Gurski. The institute's program for the meet, attended by employees and the public, also included competition by boys' and girls' teams, a parade, prize drawings, professional wrestling and free carnival rides for children. Officials of the institute include C. G. Evans, president; E. H. Greenwald, A. E. Oakley and U. A. Cobb, vice presidents; J. S. Chapman, secretary; and E. E. White, treasurer. H. P. Farley was director of the meet and Van B. Stith was general chairman.

Among the Manufacturers

Pittsburgh Gear Expands

Brad Foote Gear Works, Inc., Cicero, Ill., has purchased larger quarters for its subsidiary, Pittsburgh Gear Co. The move, which will take about 3 mo. to complete, will be from 27th and Smallman St., Pittsburgh, to a site on Neville Island. Floor space of 33,000 ft in the building formerly occupied by the Cementstone Corp., 5 acres of land providing adequate storing, loading, and parking facilities and room for future expansion, and about 50 new automatic gear-cutting and hobbing machines, along with heat-treating equipment, are featured in the reported $1,000,000 expansion program.

Leschen Names District Mgr.

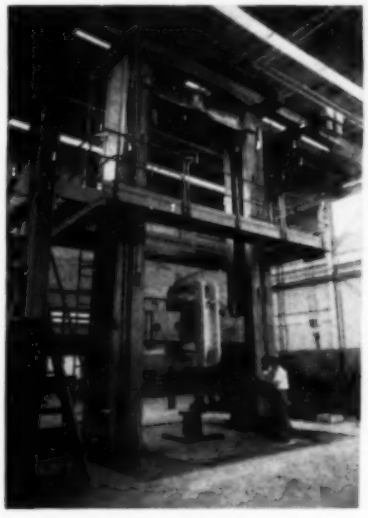
Leschen Wire Rope Div., H. K. Porter Co., Inc., St. Louis, has named G. N. Dow Chicago district sales manager. Until his present promotion, Mr. Dow had been district representative for Leschen in Detroit.

Koehring Moves Sales Heads

Koehring Co., Milwaukee, Wis., has announced two transfers in the sales departments of Koehring and of Parsons Co., Newton, Iowa, one of its subsidiaries. R. E. Bansemer, assistant sales manager for Koehring since 1950, has been named sales manager for Parsons. M. O. Messenger, sales manager at the Iowa plant, has been named assistant sales manager for the parent company. Mr. Bansemer joined Koehring in 1923 and Mr. Messenger joined Parsons in 1939.

National Malleable Opens New Technical Center

A new technical center, designed to meet the National Malleable & Steel Castings Co.'s growing need for a central technical service, was officially opened Oct. 14 at the company's Cleveland plant. Highlighted among the special equipment units installed is the 1,000,000-lb universal static testing machine above, said to be the world's largest of its kind. The new centralized facility includes four coordinated sections: (1) an extensive physical testing laboratory with a wide range of testing equipment, including electronic measuring and recording devices; (2) an engineering department, which develops products, engineers production methods and provides



customers with technical services; (3) a proving ground, with test tracks, car pits and specially equipped railroad and mine cars; and (4) administrative quarters and meeting rooms. While the center was conceived to serve the company's need, it is its hope that the center, because of its equipment and design, will become a focal point for advanced thinking, testing and research for other companies and institutions.

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricants

One for all...

More and more midwest mines are realizing important savings through the versatility of SUPERLA Mine Lubricants. Inventories have been simplified and over-all lubrication costs reduced.

In one mine, a SUPERLA Mine Lubricant was adopted for use in main transmissions and gathering heads of Joy loaders and in the wheel bearings of coal cars as well. In over three years' operation, there has been no downtime because of scored clutch plates or faulty lubrication. In the cars, leakage of lubricant from bearing housings has been eliminated.

Also in this mine, a SUPERLA Mine Lubricant has provided trouble-free lubrication in the transmissions of Goodman loaders and in the gear cases of cutting machines. In more than three years of operation, there have been no cases of downtime of loaders or cutters due to faulty lubrication. Warm-up time for the loaders has been eliminated.

These are the big jobs, but the versatility of SUPERLA Mine Lubricants covers a wide range of applications from motor armature bearings to loading machine hydraulics. The chances are you can replace several special-purpose lubricants with one or two SUPERLA Mine Lubricants and get better lubrication results in each case. There's a Standard Oil lubrication specialist located near you who knows mining equipment and who will work closely with you. To reach him, you need only call your local Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY STANDARD *(Indiana)*

MEETINGS

Conference on the Commercial and Economic Health of the Bituminous Coal Industry: Nov. 13, College of Commerce of West Virginia University, Morgantown, W. Va.

Kentucky Mining Institute: Annual Meeting, Nov. 12-13, Phoenix Hotel, Lexington, Ky.

Coal Conference: Dec. 3-4, University of Missouri School of Mines and Metallurgy, Rolla, Mo., in cooperation with the Missouri Coal Operators' Association and the Missouri Geological Survey.

Coal Mining Institute of America: 67th Annual Meeting, Dec. 10-11, William Penn Hotel, Pittsburgh, Pa.

U. S. Rubber Names Managers

U. S. Tires Div., United States Rubber Co., has named two new division managers, transferred another, and named two new district managers. H. Newman Roberts, district manager at Charlotte, N. C., has been promoted to southern division manager, with headquarters in Atlanta. Walter F. Brown, manager of market development, has been named manager of the revised north central division, with headquarters at Detroit. Harry R. Mack has been transferred from southern division manager to central division manager, with offices in Chicago. Named district managers were: Edwin W. Means, Charlotte, N. C., and Robert R. Walker, Philadelphia. Mr. Means was assistant district manager at Charlotte. Mr. Walker was district manager at Cincinnati and at Pittsburgh, and succeeds E. J. Bassine, who resigned.

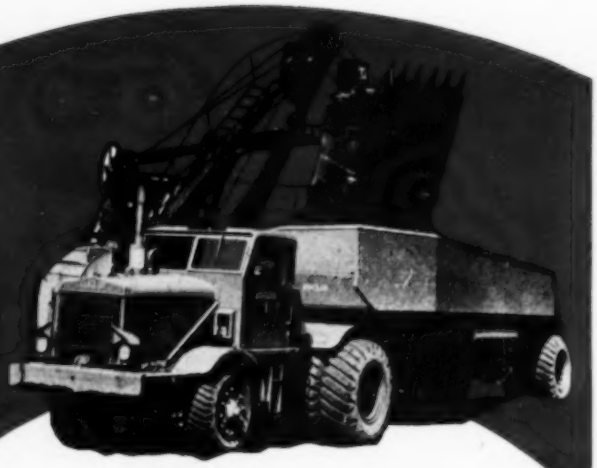
Dr. Blake Cited for Research

Dr. John T. Blake, director of research, Simplex Wire & Cable Co., Cambridge, Mass., was awarded the Charles Goodyear Gold Medal, the highest honor in rubber chemistry, at the national meeting of the American Chemical Society in Chicago, Sept. 10. The award was made to Dr. Blake for nearly 30 yr of service to the nation's rubber industry. During his work, he developed low-water absorption deproteinized rubber insulation to make dependable underground rubber cables possible. In addition to outstanding work in many fields of rubber chemistry, Dr. Blake and his group also pioneered in isolating and correcting the causes of occasional unexplained failures of underground cable. During World War II, Dr. Blake served with the Office of the Rubber Director of the WPB and currently is a consultant to the Research and Development Board of the Department of Defense.

Mosebach and Allegheny Merge

Mosebach Electric & Supply Co., Pittsburgh 3, Pa., has merged with Allegheny Warehouse Corp., McKees

Increase Metal Life
3 to 5 Times
with
WHITMORE'S
Lubricants



DIFFERENTIALS AND TRANSMISSIONS

Whitmore's Pressure-Proof Lubricant will increase the life of transmissions and differentials (including Hypoid) far beyond the period that may be expected when any other lubricant is used.

FINAL DRIVES

Whitmore's eliminates grinding and scuffing of the gears in final drives. Metal to metal contact cannot occur due to the lubricant's affinity to adhere to the metal surface.

TRACK ROLLER BEARINGS

Dirt, Coal and other foreign matter are sealed out. Whitmore's forms a tough film which stays put while the bearings work in an efficient, dirt-free lubricant when properly applied. It will increase bearing life at least 7 times. In the use of Whitmore's Lubricant you buy INSURANCE against costly repairs and tonnage loss.

Whitmore originated Pressure-Proof Lubricants as far back as 1886. Government tests show Whitmore to be the leader. In 1935, during tests conducted by disinterested engineers, certain Whitmore Lubricants took what they estimated to be pressures of over 60,000 pounds to the square inch.

Give us your toughest lubricating problems to test our claims. Let us prove we can save you money through prolonged life of parts, elimination of break-down time, and increased efficiency.

Serving the Mining Industry for more than Half a Century

WHITMORE'S
PRESSURE-PROOF
LUBRICANTS
SUPER E.P.

THE WHITMORE MFG. CO., Factory and General Offices, CLEVELAND 4, OHIO, U. S. A.

EQUIPMENT APPROVALS

Six approvals of permissible equipment were issued by the U. S. Bureau of Mines in September, as follows:

Jeffrey Mfg. Co.—Type MT-66 cable-reel shuttle car; three 10-hp motors, 500 v, DC; Approval 2-902A; Sept. 29.

Joy Mfg. Co.—Type WK-82-T Model 240 air compressor; one 50-hp motor, 400 v, AC; Approval 2-953A; Sept. 4.

Lee-Norse Co.—Model CM32 miner; two 5- or 6-hp, one 10-hp and two 20-hp motors, 250 v, DC; Approval 2-954; Sept. 14.

Joy Mfg. Co.—Type 6SC4BPE/BPXE-3 cable-reel shuttle cars; one 10-hp and two 20-hp motors, 250 v, DC; Approval 2-955; Sept. 15.

Jeffrey Mfg. Co.—Power unit for conveyor; one 40-hp motor, 220 v, AC; Approval 2-956; Sept. 30.

Mine Safety Appliances Co.—Type No. 73478 methane alarm; Approval 811; Sept. 4.

Rocks, Pa. In the merger, Mosebach is the surviving firm, and the move is in line with the company's planned expansion and diversification program. The following Mosebach appointments were made: Ralph M. Nadler, executive vice president; Harold J. Evans, vice president in charge of operations; George F. Baney, assistant vice president in charge of purchasing and customer relations; Edwin L. Core, assistant vice president and general manager.

U.C.C. Promotes Researchers

Union Carbide & Carbon Corp., New York, has appointed Dr. Raymond W. McNamee manager of research administration, coordinating the research activities of all of the corporation's laboratories where basic research and development is being done on alloys, chemicals, gases, carbons and plastics. Dr. McNamee joined the corporation's chemical research organization in West Virginia, in 1933 and, since 1950, has been superintendent of the Research and Development Dept. of Carbide & Carbon Chemicals Co., a division of Union Carbide. His successor, Dr. Franklin Johnston, joined Carbide & Carbon Chemicals Co. in 1933 and in 1951, was appointed assistant director of research for the company. Dr. Henry C. Chitwood, former research group leader, was named assistant director of research—organic chemicals.

N.M. & S.C. Advances Four

National Malleable & Steel Castings Co., Cleveland, has promoted four executives at the Chicago and Indianapolis works. Roy C. Hobson, assistant to the vice president in charge of sales at Cleveland, has been named assistant manager of the Chicago Works. Mark M. Miller, sales manager, Indianapolis

Works, succeeds Mr. Hobson. John H. Murphy, with the company since 1930, has been made sales manager at Indianapolis, and John A. Koehl has been named assistant sales manager at the same plant.

Sprague & Henwood Branch

Sprague & Henwood, Inc., Scranton, Pa., has opened a new western branch in Grand Junction, Colo., managed by Robert R. Carver, former assistant manager, Contract Dept. A mining-engineering graduate of the University of British Columbia, Mr. Carver has been associated with Sprague & Henwood for 6 yr.

Nordberg Opens District Office

Nordberg Mfg. Co., Milwaukee, Wis., has opened a district office at 3300 S. 2nd St., St. Louis, Mo., to serve crusher, screen, and process machinery customers in the south central and southwestern states. Harold M. Propp, formerly central district manager, is in charge of the new office, which now gives Nordberg six domestic district offices.

Johnston Pump Advances Two

Johnston Pump Co., Pasadena, Calif., has named C. L. Holbert, formerly vice president-treasurer, vice president-general manager. Rex D. Cross, formerly district sales manager, southeastern states, has been appointed national sales manager. Both men have been associated with the pump manufacturing industry for many years.

Euclid Names District Manager

Euclid Road Machinery Co., Cleveland, has appointed John C. Dix district manager for operations in Georgia, Alabama, Florida and the eastern part of Tennessee, with headquarters in Atlanta. Active in engineering and the construction equipment field for over 8 yr, Mr. Dix has been associated with Euclid, the Gradall Div. of Warner & Swasey and Lima Shovel & Crane. Euclid also has announced the appointment of the Colorado Builders' Supply Co. as its new distributor in Colorado, most of Wyoming and 11 western counties of Nebraska. Located at 1300 West Evans Ave., Denver, the firm is headed by James D. Maitland. Charles Hansen is general manager and Charles E. Berry manager of the equipment division.

Fuller Acquires Shuler Axle

Fuller Mfg. Co., Kalamazoo, Mich., has acquired all capital stock of Shuler Axle Co., Louisville, Ky., with plans to continue operations of Shuler as a wholly owned subsidiary. Acquisition of the Shuler Axle Co. marks another step in Fuller's expansion program, initiated in 1950, to meet increased requirements, and with the addition of Shuler to its manufacturing facilities, Fuller now is one of the largest manufacturers in the field of component units for off-highway trucks and construction equipment, it reports.

keen?

Keen judgement can save you a peck of trouble when it comes to picking the right line of lubricants . . . and top mining men, throughout the country, with a keen eye for increased production and fewer machinery repairs, have chosen the complete Cities Service line. Find out about the super-performance of Cities Service lubricants and take advantage of the free services of an expert Cities Service Lubrication Engineer. Write Cities Service Oil Company, Dept. K5, Sixty Wall Tower, New York 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Hough Adds Two Salesmen

The Frank G. Hough Co., Libertyville, Ill., has appointed two new district representatives to work with its distributors. Jack C. Bever will operate in the sales district comprising the District of Columbia, Maryland, Virginia, West Virginia and the Carolinas. Dwain Richey will cover Arkansas, Louisiana, Oklahoma, Texas and New Mexico.

Peerless Makes Sales Changes

Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, has named Everett W. Lundy, assistant sales manager. Previously Pacific district manager, he has been succeeded by Robert H. Hull, Central district manager at Indianapolis. Waldo T. Harman, Chicago branch office manager, succeeds Mr. Hull.

And For Your Information . . .

Goodman Mfg. Co. this month honors 220 workers at its eighth annual banquet for employees with more than 25 yr of service. Highlights of the program are presentation of diamond pins to this year's 25- and 35-yr people and comments on current business conditions by William Goodman, company president. Of the Goodman staff now wearing service pins, 63 have 35 yr of service or more and 157 are 25-yr veterans.

General Electric Co., silicone products department, Waterford, N. Y., has established new sales districts for the East and Midwest, in New York and Cleveland, respectively. Albert L. Baldock has been appointed manager of the Eastern Sales Dist. and the Midwestern Sales Dist. is managed by Constantine L. Chase. Mr. Baldock came to General Electric in 1947 as a member of the advanced scientific training program and joined silicone headquarters in 1948. Mr. Chase joined General Electric in 1947 as a member of the scientific training program and was transferred to Pittsfield in 1948.

Marion Power Shovel Co., Marion, Ohio, has appointed the Tulsa Equipment Co., Inc., Tulsa, Okla., a new distributor of its products. Officers of Tulsa Equipment, located at 1804 N. Lewis, are: F. L. Squires, president, C. L. Edwards, vice president and sales manager, Bill Fuller, treasurer, and J. Ray Huffine secretary.

The Colorado Fuel & Iron Corp. last month officially opened its new $30 million seamless tube mill at Pueblo, Colo. The new mill, the first west of the Mississippi, will be an important supplier of seamless steel tubing and casing to the oil and gas industries of the western United States and Canada, and is the latest milestone in CF&I's long-range program of expansion and diversification.

Linatex Corp. of America, Rockville, Conn., has appointed Toncray Equipment Co., 1732 Blake St., Denver, Colo., to handle sales in that territory, with facilities for fabrication and application.

GM DIESEL
CASE HISTORY NO. 1A3-12

OWNER: Georgia Coating Clay Co., Macon, Ga.

INSTALLATION: Twelve GM Diesels power shovels, Koehring Dumptors, GMC Trucks stripping 97 feet of overburden and mining Kaolin.

PERFORMANCE: Equip. Supt. W. J. Herrington reports 6-71 powering Koehring 1½-yd. shovel (background) has worked 45 hours a week, 52 weeks a year for over 6 years--about 14,000 hours--without an overhaul. Newer ¾-yd. Lima (foreground), powered by a 3-71, has already operated for 3500 trouble-free hours.

It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL
POWER

14,000 HOURS
WITHOUT ENGINE OVERHAUL

Long engine life between overhauls is only one advantage you get with General Motors Diesel engines. Power on every piston downstroke makes a 2-cycle GM Diesel accelerate faster under load—gets more work done every hour. Simple, practical design cuts down time because it does away with such trouble sources as high pressure fuel lines. When service is needed, you'll find the cost surprisingly low. GM Diesel engines are easy to work on—simple to inspect and service. And comparison will show you that GM Diesel parts cost less.

You can get GM Diesel power in leading makes of shovels, tractors, hauling units, loaders, compressors and generators. A postcard will bring you a list of the 750 different models of equipment powered by General Motors Diesel engines.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

Barber-Greene Co., Aurora, Ill., has named the Mine & Smelter Supply Co., P. O. Box 5270, Denver 17, Colo., representatives for the sale of portable and permanent belt conveyors, car unloaders and coal loaders in the entire state of Utah plus five counties in Wyoming. In addition to the Denver office, a branch office in Salt Lake City is maintained at 121 W. 2nd South St. and a warehouse with rail facilities a block west of the Salt Lake City office.

Farmers Engineering & Mfg. Co., Irwin, Pa., has appointed Warren C. Sprague factory sales and service representative for the West Coast. Mr. Sprague, associated with the firm in various sales and service positions since 1948, will make his headquarters at Monrovia, Calif., a branch office.

L. B. Foster Co., Chicago, has completed a major expansion program at its Clearing District plant, serving the Chicago and Midwest area. The new facilities which will increase pipe fabrication capacity, include two new buildings and an outdoor crane runway, 1,100 ft. long and 60 ft. wide.

Westinghouse Electric Corp., Pittsburgh, has reported its 2-yr expansion and improvement program is nearing completion at the firm's mica plant at Irwin, Pa. The addition of a new 2-story building, approximately 200 ft long, will supplement facilities in four other buildings on the 20-acre site purchased by Westinghouse in 1948 from General Foods Corp.

Transfer of the assets of the Buda Co., Harvey, Ill., to Allis-Chalmers Mfg. Co., West Allis, Wis., was expected to be completed during the past month. The time for dissenting shareholders of the Buda Co. to demand payment for their shares expired Sept. 30. The number of shares dissenting was so small that completion of the reorganization between the two companies is assured, it was said.

H. N. Nelson, 43, assistant sales manager, Findlay Div., Gar Wood Industries, was killed Sept. 29 in an automobile accident in Moorhead, Minn. Well known throughout the earthmoving industry, Mr. Nelson spent more than 20 yr in the sales and service of heavy equipment. He joined Gar Wood in 1938 as a field service representative after 8 yr with R. G. Le Tourneau.

Clark Equipment Co., Buchanan, Mich., has appointed the Crunkleton Co., 5324 McCorkle Ave., S.E., Charleston, W. Va., as a distributor of its full line of materials-handling equipment. The new dealership is headed by Leslie D. Crunkleton Jr., and its territory includes parts of West Virginia, Ohio and Kentucky.

C. B. Hunt & Son, Inc., Salem, Ohio, has named Alfred Halliday sales representative for Kentucky, central and western Tennessee, northern Mississippi and Arkansas. Mr. Halliday maintains offices at 317 Starks Bldg., Louisville; 1509 Madison Ave., Memphis, and 916½ Henley Ave., Knoxville.

COMPTON Model 36 Coal Auger

designed for { Maximum recovery ...at Minimum cost

The new Compton Model 36 Coal Auger is the answer to the demand for rapid, economical high wall recovery in small, narrow pits. Only 36 feet long and weighing approximately 25 T., the Model 36 includes all the design advantages of the other Compton Coal Augers.

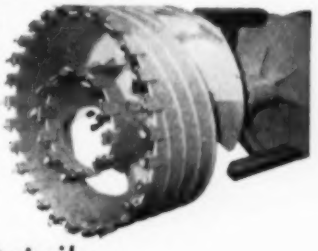
- Convenient, accessible auger sections racked on the frame.
- Synchronized winches for handling auger sections.
- Hydraulically operated pilot pan eliminates spillage between machine and highwall.
- Elevating conveyor is integral part of machine.
- Hydraulically-controlled swiveling discharge chute permits uniform trimming of trucks.
- Hydraulic jack legs (with self-leveling pontoons for better floatation) allow drilling up to 160 feet without misalignment.
- Single or vertical overlapping holes can be drilled in varying coal seam thickness.

The Compton Model 36 Coal Auger paves the way to higher quality through selective mining! Up to 60 Tons per hour recovered in actual production tests! Plan today to expand your present or future developments with Compton Coal Augers.

(Write for details about other Compton Auger Models 42, 48 and 56.)

Model 36 SPECIFICATIONS

Length: 36 *feet* *Weight: Approx.* 25 *T.*
Carries eight 20 *ft. auger sections*
Required pit width: 38 *feet min.*
Power: 150 *hp Diesel engine*
Hydraulic Frame Jack Lift: 54 *inch*
Auger Diameters: 44 *inch to* 24 *inch*
Possible Drilling Depth: 160 *feet*



The Compton Cutting Head — non-clogging type with a built - in spider bearing assembly — increases production by drilling straighter holes with less frictional drag.

Consult a Compton Engineer for Details

Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

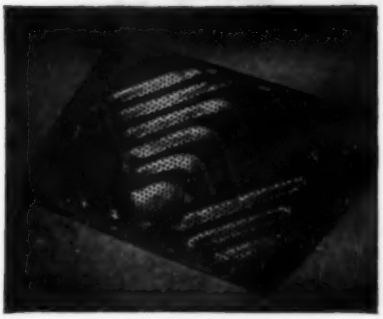
BOX 1946 – PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

162 Exhibits Make "Portrait of Anthracite"

ALMOST 1,000 GUESTS visited the "Portrait of Anthracite" art show of the Lehigh Art Alliance during a special preview held Oct. 11 at the Allentown, Pa., building of the Pennsylvania Power & Light Co. Some 162 art works ranging from oil paintings to wire sculpture were entered by the Alliance members, following their visit last summer to properties of the Lehigh Navigation Coal Co., which served as this year's sitter in the annual contest. Shown here viewing a sculpture, one of the 25 art media used to depict the various phases of anthracite mining, are: Glenn O. Kidd (center), LNC president, Garrett Conover, president, and Quentin H. Smith (right), director of development, Lehigh Art Alliance. The exhibit, which was highly praised by art experts, was open to the public until the end of October.

BCR Opens Coal Research Laboratory

THE FIRST INDUSTRY-OWNED LABORATORY, specially planned and built to expedite the bituminous coal industry's continuing program to help customers get maximum value from coal, recently was completed in Columbus, Ohio, by Bituminous Coal Research, Inc. Designed to facilitate BCR's general research program, the laboratory will house the agency's Columbus staff active in research, engineering development and technical promotion. It includes two one-story buildings with an area of 12,410 sq ft located on a 2½-acre plot. The coal research organization also carries on technical and administrative activities at its general research headquarters in Pittsburgh, coal-fired gas-turbine research at Dunkirk, N. Y., and research in mining equipment and methods in Huntington, W. Va.



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A "must" when it comes to obtaining an efficient job! *Good* because the spreading and collecting riffles give uniform spread of material over the entire screen surface . . turns the top and middle flow of material down in direct contact with the screen . . . gives an increased screening efficiency up to 33% on fine sizes over an undented flat screen.

Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

Write us today. We shall reply promptly.

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FLEXCO HINGED BELT FASTENERS

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- For joining underground extension conveyors.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates smoothly through take-up pulleys.
- Strong, durable . . . pull or tension is distributed uniformly across joint.
- For conveyor belts ⅜" to ½" thick.

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COAL CUTTING EQUIPMENT
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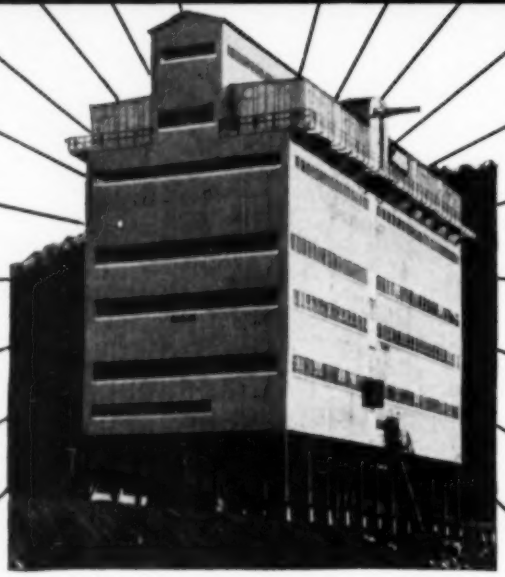
HOW POCAHONTAS FUEL COMPANY FOUND

21 GOOD ANSWERS TO The Dry Cleaning Problem



When Pocahontas Fuel Company was faced with the problem of converting the output of its Itmann Mine to a high quality metallurgical coal it consulted Roberts and Schaefer Company. Results of that profitable consultation are shown here: *one R&S-engineered-and-constructed preparation plant and twenty R&S Super-Airflow Dry Cleaning Units* . . . 21 good answers to a basic dry cleaning problem.

During its more than two years of operation producing premium metallurgical coal for a discerning market, the Itmann Mine Plant has been characterized by efficient operation and freedom from down-time for maintenance or repair.

Next time you have a coal preparation problem why not do as Pocahontas and others have done: consult Roberts and Schaefer Company, an organization that offers you all these advantages:

Complete engineering and construction facilities . . . capable of doing the whole job or any part of it . . . any time you are ready

Complete line of preparation machinery for dry cleaning or wet cleaning

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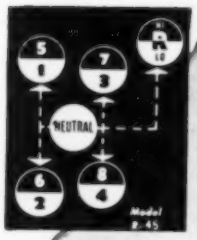
One lever controls

8 FORWARD SPEEDS

TWO REVERSE SPEEDS

NO GEAR-SPLITTING!



New MODEL R-45 ROADRANGER

Now 125-160 hp rigs can have the advantages of the new R-45 ROADRANGER Transmission

The famous one-stick Fuller ROADRANGER is now available for rigs powered by engines delivering up to 385 pounds-feet of torque.

With the new R-45, gear-splitting is entirely *eliminated*. Shifts are simple, short, and fast, with only one power shift in the whole series. Yet you have 8 forward speeds—available in *equal*, progressive, selective steps, none exceeding 38%—to keep your engine *always* turning in its most efficient range.

With this transmission, there's no more engine lugging, no more low rpm between shifts. With the Fuller ROADRANGER, you can haul more, and maintain higher average speeds than ever before—with so much better utilization of horsepower that you make 1/3 fewer shifts. Write today for full information on the new Fuller R-45 ROADRANGER.

Check These Advantages:

- Easier, quicker shifts—38% steps—one shift lever controls all 8 forward speeds
- No gear-splitting—8 selective gear ratios, evenly and progressively spaced
- Higher average road speeds—engine operates in peak hp range with greater fuel economy
- Less driver fatigue—⅓ less shifting
- Range shifts pre-selected—automatic and synchronized
- More compact than other 8-speed transmissions
- More cargo can be carried on the payload axle.

VITAL STATISTICS

GEAR RATIOS:

Low Range		High Range	
1st	9.78	5th	2.66
2nd	6.98	6th	1.90
3rd	4.99	7th	1.36
4th	3.68	8th	1.00
Reverse	11.01	Reverse	2.99

Installation Length . . . . . 29⅝"
Clutch Housing Sizes . . . . . SAE 1, 2, 3
Weight, with Standard Controls . 457 lbs.

Fuller TRANSMISSIONS ®

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 641 E. 10th Street, Oakland 6, Calif.

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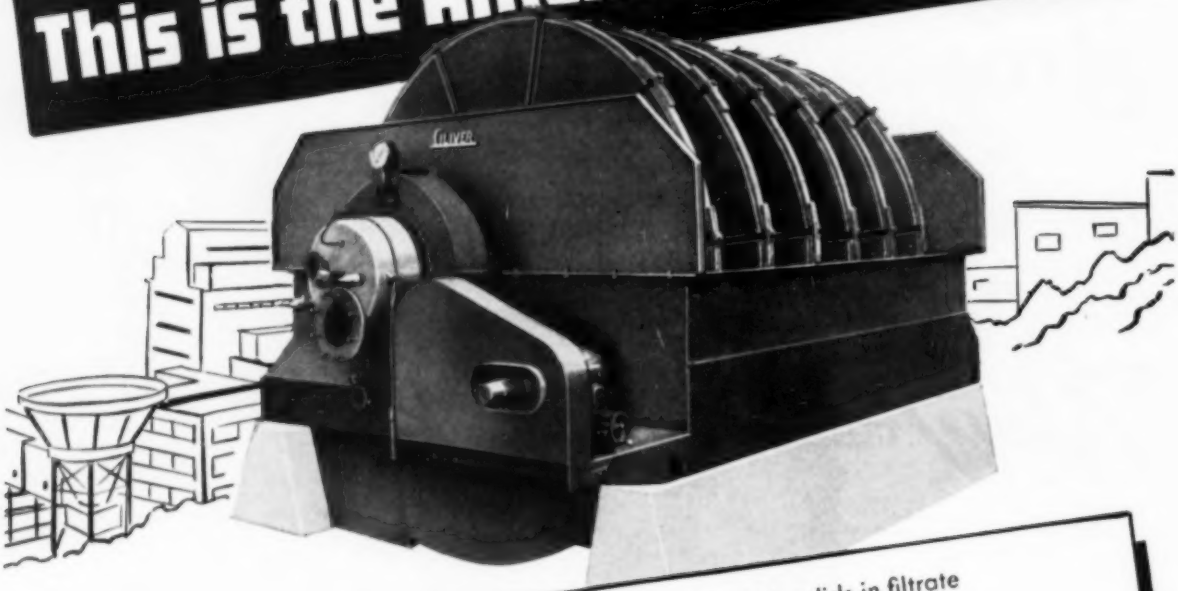

★ **IT RECOVERS COAL FINES EFFECTIVELY** — less than 1% solids in filtrate
★ **IT AVOIDS PRODUCT DEGRADATION** — handles fines gently
★ **IT REQUIRES LITTLE MAINTENANCE** — no high speed parts

This, in brief, is the record of the Americans now in service. They are uniformly successful, each recovering the fines effectively . . . each doing so without degrading the fines into finer coal . . . each operating at slow speed, thus minimizing maintenance.

Bear in mind, too, that the American is ideal for dewatering slimes and fine refuse used for mine fill or land dumping where it is not practicable or legal to pump to sludge ponds or where stream pollution is a factor. The American produces a cake that is easily handled.

If 'fines' are a problem in your washery, here is the filter that will solve it and here, at Oliver United, you can get what is equally important . . . the most experienced advice and recommendations on fines recovery.

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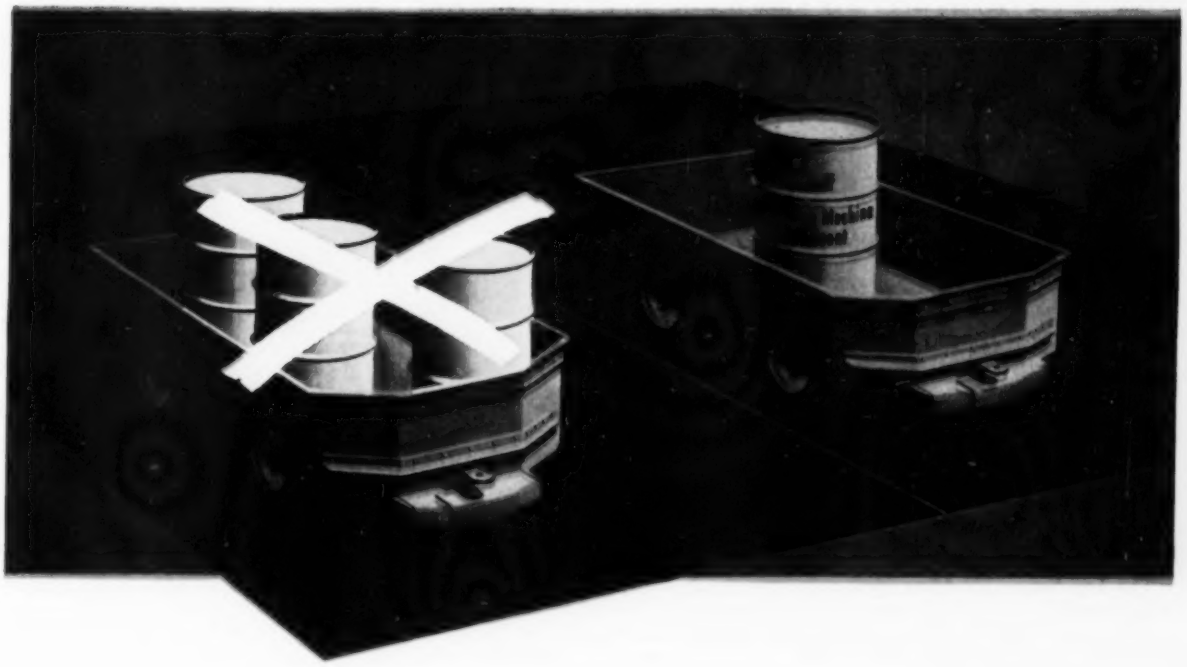

Gulf Mining Machine Lubricant

does the job of 2 or 3 other lubricants

—and does it better!

Here's effective help in your efforts to reduce maintenance costs and simplify lubricant storage and handling—from oil house to face! When you use Gulf Mining Lubricant you can eliminate from 2 to 3 other lubricants depending on the type of equipment you operate. This means less confusion at the face, elimination of application mistakes, better lubrication.

At the same time Gulf Mining Machine Lubricant provides better protection for underground cutting and loading equipment. And it is equally effective for plain and antifriction bearings and for gears in drives and transmissions.

To get the many benefits possible with this quality product, and for expert help on other phases of improved lubrication, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office today.

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GULF INDUSTRIAL LUBRICATION

Preparation Facilities

Davis Z. Norton Co., Div. of Oglebay-Norton & Co., Davis Z. Norton No. 3 mine, Powhatan Point, Belmont County, Ohio—Contract closed with Nelson L. Davis Co. for dense-media float-and-sink coal-cleaning plant, 150-tph capacity. Cleaning 6x¼ at any predetermined specific gravity between limits of 1.35 and 1.70.

Peabody Coal Co., No. 47 mine, Harrisburg, Ill.—Contract closed with Heyl & Patterson, Inc., for installation of cyclone thickener equipment for water clarification and recovery of ½mmx0 coal from normally wasted slurry, with capacity of 15 tph at 1,500 gpm.

Greensburg-Connelsville Coal & Coke Co., Hubbard mine, McKeesport, Allegheny County, Pa.—Contract closed with Heyl & Patterson, Inc., for installation of Reineveld centrifugal coal drier with capacity of 50 tph.

Cyclone Coal Co., Branchdale, Pa.—Shipment by Deister Concentrator Co. of one Model 105 Concenco revolving feed distributor for 5-way feed distribution to No. 7 SuperDuty Diagonal-Deck coal-washing tables.

National Coal Board, England—Shipment by Deister Concentrator Co. of one 4x8-ft Leahy heavy duty vibrating screen equipped with FlexElex arrangement for electrically heating the screen cloth.

Association Activities

Pennsylvania Operator Groups Re-Elect Moore President

The Central Pennsylvania Coal Producers' Association and the Eastern Bituminous Coal Association held their joint annual meeting at the Bedford Springs Hotel, Bedford, Pa., Sept. 24-25, with approximately 250 members and guests attending. At the business session, Ralph H. Moore, president of C. A. Hughes & Co., was re-elected president of both organizations. J. William Wetter was named vice president of the Central Pennsylvania association, and William H. Ritter vice president of the Eastern Bituminous group. The following were elected officers of both associations: R. T. Laing, executive director and secretary; Walter A. Jones, treasurer; and C. P. O'Neill, assistant treasurer. Elected directors of the Central Pennsylvania group were: M. J. Ackerman, T. L. Aitken, L. C. Campbell, George A. Clark, Heath S. Clark, H. J. Connolly, E. M. Cortright, A. B. Crichton Jr., M. Albert Evans, R. M. Hess, Dennis J. Keenan, John M. Kerr, John W. Krous, T. F. McCarthy, Ralph H. Moore, A. J. Palumbo, Richard Peale, W. H. Ritter, C. M. Schwerin Jr., Charles M. Shoffner, L. D. Silberstein, R. T. Todhunter Sr., W. S. Weer, J. William Wetter and Walter S. Williams. The directors elected for Eastern Bituminous were: Charles G. Berwind, Heath S. Clark, Nathan D. Cortright, A. B. Crichton Jr., F. A. Fontyn, Sam Light, J. W. McGinn,

Ralph H. Moore, John Barnes Mull, Charles A. Owen, Rembrandt Peale Jr., W. H. Ritter, Charles M. Shoffner, L. D. Silberstein, P. H. Tuttle, R. S. Walker, W. S. Weer, J. William Wetter and R. W. Wigton.

Briquetting Group Formed

At the third biennial Briquetting Conference, held at the Banff Springs Hotel, Banff, Alberta, Canada, Aug. 31-Sept. 2, the International Briquetting Association was formed. Officers elected by the newly organized group were: H. C. Richter, president, Stott Briquet Co., St. Paul, Minn., president; A. D. Sturrock,, Nordegg, Alberta, vice president; and Neal Rice, coal research chemist, Natural Resources Institute, University of Wyoming, Laramie, Wyo., secretary-treasurer. Proceedings of the Briquetting Conference will be published by the Natural Resources Research Institute and will be available in several weeks.

AMC Plans 1954 Convention

Edward G. Fox, president, Philadelphia & Reading Coal & Iron Co., Philadelphia, Pa., has been named national chairman of the program committee planning the American Mining Congress 1954 Coal Convention to be held in Cincinnati, Ohio, May 3-5, 1954. A national committee, composed of coal mining officials and mining equipment manufacturers, will meet in the near future to draft a program for the convention.

Tuohy Named BCR Director

Walter J. Tuohy, president of the Chesapeake & Ohio Ry., has been elected to the board of directors of Bituminous Coal Research, Inc., it was announced last month. Before becoming president of the C. & O. in 1948, Mr. Tuohy was vice president of coal traffic and development for 5½ yr and has long been an active supporter of coal research.

Stoker Mfrs. Re-Elect Officers

At the annual meeting of the Stoker Manufacturers' Association held in Cleveland, Ohio, Oct. 1, the following officers were re-elected: L. C. Dubs, president, Canton Stoker Corp., Canton, Ohio, president; B. O. Fink, president, Auburn Foundry, Auburn, Ind., vice president; and H. B. Scoville, assistant manager, Cotta Transmission Co., Rockford, Ill., secretary-treasurer. Speakers on the program included R. L. Ireland Jr., chairman, executive committee, Pittsburgh Consolidation Coal Co., and Marc G. Bluth, special field representative, National Coal Association.

BCR Holds Chicago Meeting

Over 50 executives of coal, railroad and equipment companies met at the Chicago Athletic Club Sept. 29 in one of a series of meetings being held throughout the country to report on industry sponsored research designed to build coal markets. Henry C. Woods, chairman of the board of the Sahara Coal Co., served as chairman of the meeting, and Dr. A. A. Potter, president of Bituminous Coal Research, Inc., reviewed industry progress and future opportunities.

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Pure Oil specializes in top-quality industrial oils and greases designed to do several *different* jobs—instead of one specific job. And to do each job *equally well.*

Regardless of the type of machinery you have in your plant, our industrial engineers can nearly always help you to reduce your lubricants inventory . . . simplify your lubricating procedure . . . minimize waste and error.

Mail coupon today for free "Simplify and Save" booklet giving full details on how to start a labor-saving, money-saving, lubrication program in your plant.

Hundreds of machines . . . only one grease!

A large midwestern metal-working plant produces chrome-plated trim (hub caps, grills, etc.) for the automotive industry. All types of metal-working equipment—400-ton presses, shears, drills, lathes, roller-levelers and grinders—are used as well as huge chrome-plating machines. Yet *only one grease*—Pure Oil's POCO HT GREASE B—and one dispenser is used for *all* applications! And in 3 years there has been no down time due to lubrication failures.

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***Sales offices located in more than 500 cities, including:** Atlanta • Birmingham • Charleston • Charlotte • Chattanooga • Chicago Columbus • Indianapolis • Jacksonville • Madison • Memphis • Miami • Milwaukee • Minneapolis • Pensacola • Pittsburgh • Richmond

PERSONALS . . . From p 150

in 1942. He became general superintendent of the Powellton Div. in 1950 and early in 1953 was assigned special duties under the Coal Div.'s production manager. **James T. Craddock,** who has been on special duty at Eccles during the past year, was with EG&FA for 41 yr. He has served as general mine foreman at Stotesbury and Helen mines.

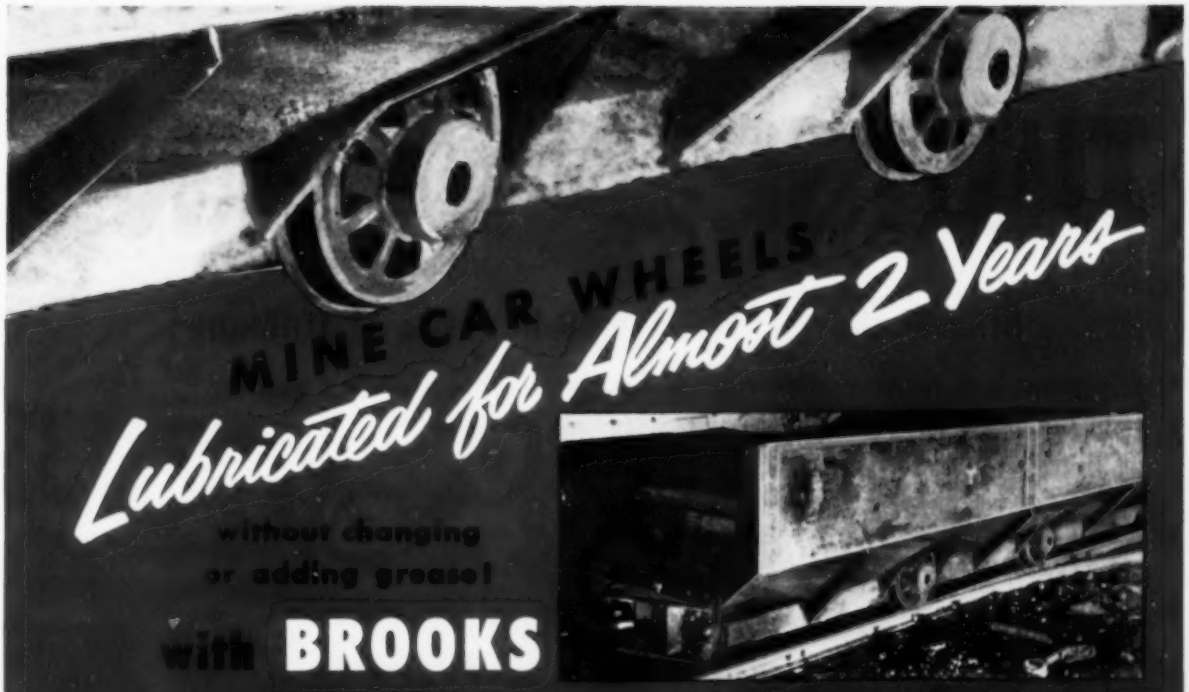
Obituaries

H. A. Reid

H. A. Reid, 56, vice president in charge of operations, United Electric Coal Cos., Chicago, died Oct. 20 after a prolonged illness. A native of Georgetown, Ill., Mr. Reid was active in Illinois mining and engineering activities for many years. Mr. Reid was chief engineer for United Electric before becoming vice president in charge of operations in 1941.

Richard Maize

Richard Maize, 77, retired Secretary of the Pennsylvania Department of Mines, died Oct. 10 at his home in Uniontown, Pa. With the department of mines for 44 yr, Mr. Maize for many



MINE CAR WHEELS

Lubricated for Almost 2 Years

without changing or adding grease!

with **BROOKS**

LEADOLENE 375

A large mine in Western Pennsylvania tested *Leadolene 375* in the roller-bearing wheels of an 8 ton capacity steel mine car. At two month intervals, a wheel was removed and inspected. At the end of *22 months* a few ounces of the lubricant remained in the housing and the roller bearings were in perfect condition. No grease was added!

This test was made under actual mine operating conditions—with the car being subjected to regular coal mine loading and transportation practice. It is an outstanding achievement for Leadolene 375, since it has been customary to grease mine car wheels every six months, with other lubricants.

Investigate the savings made possible with Leadolene 375 in lubricating roller bearings in *your* mine car wheels. Write our nearest sales office today!

LEADOLENE 375 IS WATER REPELLENT!

HELPS TO SAVE POWER!

MAKES HAND PUSHING EASY!

GIVES MINE CARS ADDED LIFE!

LEADOLENE 375 SPECIFICATIONS

This lubricant has a consistency of No. 2 and 3 Cup Greases, N.L.G.I. grades, or an A.S.T.M. worked penetration range of 220 to 375, or channel point of 10° to 25°F, and a drop point of 200° to 225°. Film strength (Timken) 40 pounds L.A.L.

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Brilliant new design opens new era in trucking!

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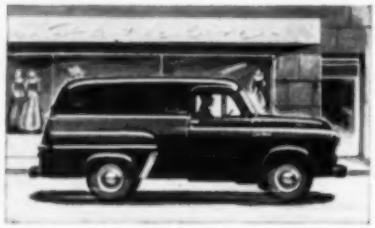
2 GREAT ENGINE LINE-UPS! In addition to cost-cutting 6's, Dodge now offers the most powerful V-8 engines of all leading trucks! Available in 1½-, 2-, and 2½-ton models . . . standard in 2¾-, 3-, 3½-ton! Revolutionary hemispherical combustion chamber for high efficiency! Get free book on engine efficiency and its importance to you at your Dodge dealer's!

OVER 75 NEW FEATURES! Spectacular low-built lines! New increases in G.C.W.! New cab sealing against dust, drafts! Nonskid running boards!

PLUS famous Dodge features like . . . completely rustproofed sheet metal . . . moistureproof ignition! Truck-o-matic transmission with gýrol Fluid Drive, available!

New! Even greater values . . . yet still priced with the lowest!

New! Sharper Turning! New steering system for the shortest turning of all leading trucks! New shorter conventional tractors! New, one-piece windshield! More total vision area than any other popular make!



New! Smarter Styling! New colors! New flow-line design, featuring integral fenders, sparkling chrome! New two-tone interior styling! New wider doors! New easy-chair seats! New instrument panel.

New! Lower Lines! Pick-up and panel floors knee-high for loading ease! Lower running board for easier entry! Lower hood for greater visibility! New, low center of gravity for road-hugging stability!

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years was deputy secretary, and headed the department from 1940 until January of this year, when he retired and opened offices as a consultant mining engineer. Mr. Maize was widely known throughout the industry for his many years of effort in making mining safer and had been active in various mining associations.

C. W. Bondurant, 87, pioneer coal operator in southwestern Virginia, died Sept. 22 at his home near Dryden, Va. As a young man, Mr. Bondurant opened the first coal mine in the Saint Charles field in Lee County, Va., and was active in the coal industry until his recent retirement due to ill health.

John G. Reese, 64, a chief electrician for Glen Alden Coal Co., Wilkes-Barre, Pa., died in September following a heart attack suffered several days previously. He had been employed as a chief electrician for the Glen Alden operations for many years.

Lester C. Youtzy, 65, died Sept. 24 of a heart attack at his home near Crellin, Md. He was secretary-treasurer and co-owner of the Kray Coal Co. and Stanley Coal & Supply Co., as well as a vice president and director of the Garrett National Bank.

NEWS BRIEFS . . . From p 136

Pittston Buys Four Mines of Pursglove Coal Service Corp.

Purchase by the Pittston Corp., New York, of four mines of the Pursglove Coal Service Corp. in Harrison County, West Virginia, effective Nov. 1, was announced Oct. 7. According to reports, the properties will be operated by the Compass Coal Co., a Pittston subsidiary affiliated with the Clinchfield Coal Corp. Included in the transfer were the Mars, Chieftain No. 1 and Chieftain No. 4 mines, Wilsonburg, and the Chieftain No. 2 mine at Dola. In a statement to employees, William L. Pursglove, president of Pursglove Coal Service, said that present productive capacity would be maintained under the new owners and that more working time and greater security for employees could be expected as a result of the arrangement.

Coal Still Tops Competitors As Source of Energy

Coal maintains its top position as the leading supplier of the nation's requirements for heat and energy in the fields where coal, oil and natural gas are competitive, according to a recent analysis released by Bituminous Coal Institute. Coal's share of the total in 1952 was 42.2%, BCI figures showed, as compared with 24.8% for petroleum products, 27.2% for natural gas, and 5.8% for water power. In arriving at the respective shares of coal, oil and gas in the competitive market, BCI reduced their consumption to Btu content for comparison purposes and excluded from the evaluation gasoline, diesel fuel for trucks, lubricants and oils used for road

maintenance, and natural gas used in the manufacture of carbon black, since these uses are non-competitive with each other or with coal. The USBM in its published reports on the annual supply of energy continues to adhere to its traditional practice of including total petroleum and natural gas marketed, regardless of their end use or competitive relationship, BCI points out, emphasizing that the Bureau's percentages of the total inflate the competitive position of oil and gas in relation to coal and give an unrealistic picture of the competitive energy market.

Coal Companies Report

Island Creek Coal Co. reports net income of $1,025,899, or 77¢ per common share, for the 9 mo ended Sept. 30, 1953, against $2,117,105, or $1.69 per common share, for the same period a year ago.

Pond Creek Pocahontas Co. reports consolidated net profit of $995,679, or $2.93 per share of capital stock, for the 9 mo ended Sept. 30, 1953, compared with $1,194,216, or $3.52 per share, in the same period in 1952.

West Virginia Coal & Coke Corp. reports net profit of $422,342, equal to 84¢ per share, for the 9 mo ended Sept. 30, 1953, against $314,899, or 63¢ in the corresponding period, 1952.

Lehigh Coal & Navigation Co. reports net income of $289,000 for the first 9 mo of 1953, after a tax carry-back credit of $322,000. The report adds that Lehigh Navigation Coal Co., a subsidiary, suffered severe losses in the period because of a bad price situation and a 30-day strike on the Lehigh & New England R. R.

Oil Price Cuts Loom

Robert G. Dunlop, president, Sun Oil Co., declared Oct. 15 that the best way to end an oversupply of oil products is to cut prices. Price reductions, he said, would boost consumption of gasoline and other products, improve efficiency and make importation of crude oil from overseas less attractive.

West Virginia Conference to Discuss Bituminous Economics

The Commercial and Economic Health of the Bituminous Coal Industry is the subject of a Conference being held by the West Virginia University College of Commerce at Morgantown, W. Va., Nov. 13. Speakers will include: Tom Pickett, executive vice president of the National Coal Association, "Coal—Its Place in the National Economy"; Julian E. Tobey, president, Appalachian Coals, Inc., "West Virginia Coal—Its Place in the State Economy;" and H. W. Schweinsberg, plant production superintendent, E. I. du Pont de Nemours & Co., Charleston, "West Virginia Coal—A Basic Industrial Material." Members of the conference committee are: chairman, L. C. Campbell, vice president, Eastern Gas & Fuel Associates, and NCA president; vice chairman, D. L. McElroy, vice president, Pittsburgh Consolidation Coal

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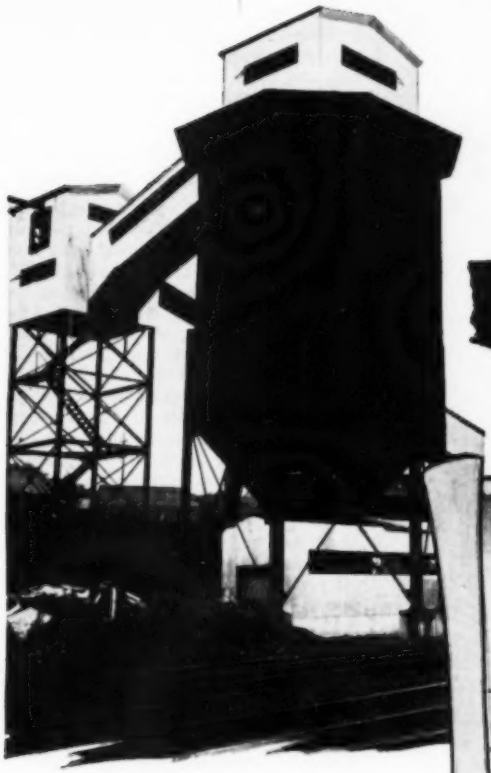

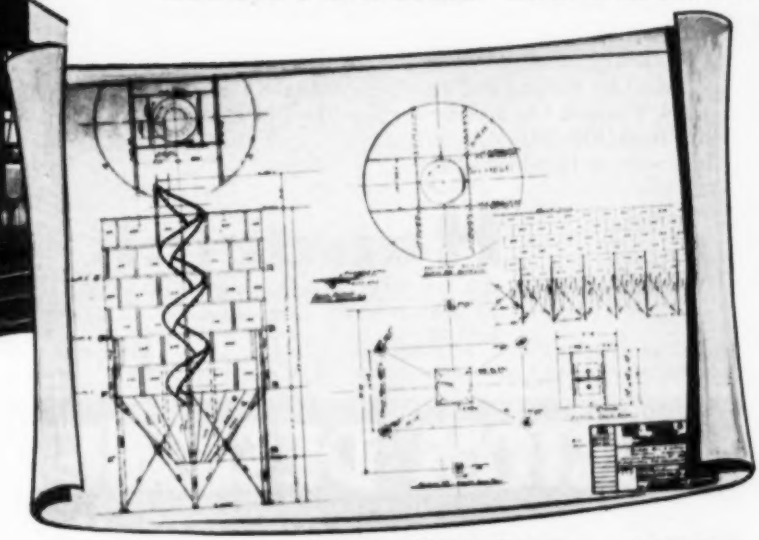

THIS INSTALLATION of a Holmes Lowering Spiral and Coal Storage Bin (Steel Type) was made at the Jamison Coal & Coke Co., Mine 21, Hostetter, Pennsylvania.

It was preceded by a careful survey of the requirements and was *individually engineered* to do the job for which it was intended.

LOAD BINS FAST... AVOID BREAKAGE WITH HOLMES LOWERING SPIRALS

- **No droppage to degrade your coal**
- **No wear and tear on bins**
- **Costs nothing to operate** (gravity operated)

Robert Holmes Lowering Spirals are designed to lower material through the use of centrifugal force, thus eliminating the need of an inside retaining lip. Each spiral is formed like a well-banked race track. The coal automatically slows down when it reaches the "safe" speed limit, regardless of the distance of travel.

As there is no retaining lip, the coal slides gently off onto the peak of the pile to form a natural angle of repose. In this way, the coal is spread out uniformly . . . a real advantage where segregation is a problem.

Lowering spirals are essential to proper handling in surge bins, run-of-mine storage bins and pockets, mine retail sales bins, and consumer storage systems.

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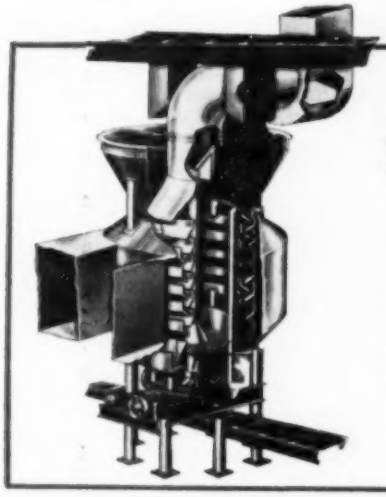

CONTINUOUS-FLOW ONE-PASS DRYING with *Baughman* VERTI-VANE THERMAL COAL DRYER

Both low in initial cost and operating cost . . . each Verti-Vane unit is designed for capacities from 15 to 75 tons. It handles all coal sizes from 1½" down. Reduces surface moisture to approximately 2% in a "one-pass" operation. Minimum of moving parts and slow-speed operation tend to eliminate shift breakdowns and lost time. Easily adjusted for feed conditions . . . requires little attention.

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Manufacturers of: SHEAVES, TIPPLE EQUIPMENT, CAGES, SKIPS, LOWERING SPIRALS, CAR PULLERS AND RETARDERS, DRYERS, LABORATORY CRUSHERS, HOISTS, VIBRATING SCREENS, DUSTOLATORS.

Co.; R. W. Coleman, dean, West Virginia College of Commerce; George Dunglinson Jr., executive vice president, Norfolk & Western Ry.; R. E. Hodges, division manager, Appalachian Electric Power Co.; and C. R. Spindler, director, School of Mines, West Virginia University.

Revision of Virginia Mine Law Proposed by Safety Commission

The report of a special commission created by the 1952 Virginia legislature to study the state's mining laws was made public Oct. 17. The commission's 5-point program, designed to tighten the state's safety regulations, was backed by Edmond M. Boggs, state Labor Commissioner, who said that he believed both operators and the union would support the recommendations. Major points in program were: (1) employment of a certified mine foreman at any coal mine with three or more employees instead of "five or more" as now called for; (2) limitation of the use of black powder to pellet form and then only under fair and reasonable safety instruction issued by the chief mine inspector; (3) revised regulations for mine ventilation to include "the best practices in this field"; (4) more adequate control of the types of explosives and detonating equipment; and (5) broadening of laws to include all mines in some particulars and special regulations for coal mines.

Illinois Stripper Upheld in Fight Against County Zoning

A suit brought by the Midland Electric Coal Co. to declare unconstitutional a zoning ordinance passed by Knox County, Illinois, that prohibited strip mining in certain areas was upheld by the Illinois Supreme Court late in September. The state court affirmed a decision of the Knox County Circuit Court some time ago that ruled that the ordinance was unconstitutional because it was passed after the coal company had spent $300,000 developing the land, building roads, installing utilities and testing for coal, some 10 yr before. As coal land the property in question was reported to be worth some $5,000 an acre, while as farm land its value was estimated at $200 to $300 an acre.

Kentucky Pickets Released

A United States district judge in Pikeville, Ky., Oct. 12, dismissed charges against seven men accused of using violence and threats during a UMWA organizing drive on the Kentucky-Virginia border May 10, 1951. They were the last of 13 men originally indicted to be freed of the charge. One man was released last January at the trial, when a jury could not agree on the guilt of the other 12. At the retrial last June, a jury freed five more but could not agree on the remaining seven. In West Virginia, three coal producers pleaded guilty last month in a U. S. District Court at Charleston to charges of violating the Fair Labor Standards. They were accused of paying employees less than the 75¢ hourly minimum, failing to pay

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The *exclusive* Rust-Oleum formula was developed by a Master Mariner during more than 20 years of combating the terrible rust-producing conditions of the sea. It incorporates a *specially-processed* fish oil vehicle that *dries*, is *odor-free*, and is formulated in *many colors*. It may be applied directly over *sound rusted surfaces* after scraping and wirebrushing to remove rust scale and loose particles. See why nearly every type of industry in the world has relied upon Rust-Oleum for over a *quarter century*. Clip the coupon to your letterhead and mail today.

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Gentlemen: I am interested in the *complete* Rust-Oleum story. Please send me the facts and the name of my nearest Rust-Oleum Industrial Distributor.

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overtime and failing to keep proper work records.

Coal Group to Meet in Missouri

A coal conference aimed at developing and maintaining industrial uses for coal will be held at the University of Missouri School of Mines and Metallurgy, Rolla, Mo., Dec. 3-4. Other sponsors of the 2-day meeting are the Missouri Coal Operators' Association and the Missouri Geological Survey. General topics of the conference, with outstanding authorities scheduled to speak, are geological features of coal deposits, mining and exploitation of coal deposits, problems of coal preparation and problems of coal utilization and markets. Persons interested in attending the conference may obtain details on housing and program by writing to Prof. J. D. Forrester, chairman, Department of Mining Engineering, School of Mines & Metallurgy, Rolla, Mo.

Bituminous Output Holds Up

Bituminous production for the week ending Oct. 17, 1953 was 9,515,000 tons and for the year through that date was 361,853,000 tons, 2.4% under the total for the corresponding period of 1952, according to USBM figures. Output for the corresponding week of 1952, ending Oct. 18, was 8,382,000 tons.

British to Open Large Mine; To Hoist Coal by Pipe Line

A new colliery with access to untouched reserves of at least 100 million tons of workable coal is to be built in northwest England, the National Coal Board announced last month. Located at Agecroft, near Manchester, on the site of an old pit closed for nearly 30 yr, the colliery is expected to employ 1,600 men and have a daily output of some 4,000 tons when it reaches full production in 1960. By using existing shafts for ventilation and access, the Board expects to save 3 yr in development time, but will sink a new hoisting shaft 2,100 ft deep, which will eventually be extended to 3,600 ft. As a part of several research projects under way, an experimental 8-in pipe line, 1,000 ft long, will be constructed in Scotland to carry 2-in anthracite crushed at the bottom to the washing plant on the surface, the NCB also revealed. Also reported was development work on a new-type coal plow, designed with a percussion action in its cutting wedge that is said to make it suitable for operation in areas of hard seams.

Australian Miners Give Way To More Machine Use

After years of negotiations, protests, strikes and other opposition, Australian coal miners have finally agreed to the mechanical extraction of coal pillars, subject to a final arrangement on the stowage of gob as roof support, it was reported last month. Previously, miners had insisted on hand methods of extraction and leaving of coal for support. As a result, more than 300 million tons of coal in pillars, mostly rich gas coal,

The Demand for Metallurgical Coal is Constantly Increasing

• It requires scientific preparation to produce "Metallurgical Coal" that can be converted, with minimum loss, into the highest quality coke. In 1951, 121,749,000 tons of coal were consumed in the production of coke, gas and steel.

FAIRMONT designs, fabricates and erects preparation plants that enable you to produce coal of uniformly high chemical and physical properties and permits you to compete favorably for your share of this growing market.

FAIRMONT plants located throughout the industry are meeting rigid premium coal specifications with cleaning plants designed to meet specific requirements.

FAIRMONT guaranteed cleaning plants are designed in sizes ranging from 40 tons per hour up to any desired capacity.

Consult FAIRMONT ENGINEERS on your coal preparation problems.

You can meet rigid specifications with a FAIRMONT Preparation Plant

FAIRMONT MACHINERY COMPANY

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Designers and Constructors of Complete Coal Preparation Plants Using Both Wet and Dry Cleaning, Centrifugal and Thermal Drying.

will be available for rapid and efficient mining by machine. According to reports, insufficient machinery is now available to do the work and more equipment must first be obtained.

Glen Alden Discusses Company Economics With Miners' Wives

Pointing out that the company's accident rate in August was under that of July, Francis O. Case, president of Glen Alden Coal Co., recently again wrote the 8,000 wives and mothers of Glen Alden workers to urge their continued help in fostering safety. Reporting that many replies to his first letter sent out in July (*Coal Age*, September, p 110) had asked about work prospects, Mr. Case also outlined the steps the company is taking to stabilize working time by "a new aggressive sales policy and the increased use of machines." He also assured them that "management will continue the battle to put the company back on its feet so that the entire Glen Alden family can face the future with a minimum of economic worries."

And For Your Information . . .

More than 500 operating, administrative and sales personnel and special company guests attended a dinner party given by the Pocahontas Fuel Co., Inc., in Bluefield, W. Va., Oct. 3, with A. R. Matthews, company president, serving as host. Billed as an "Original Pocahontas" party, it was the first affair of its kind held by the company and had to be staged in the West Virginia National Guard Armory to accommodate the crowd.

Seven important coal mining officials in East Germany recently were sentenced to prison terms ranging from 4½ to 15 yr after a 6-day trial on charges of sabotage and conspiracy with the West. One recipient of a 15-yr sentence was Dr. Otto Fleischer, former director of the mining institute and winner of the country's equivalent of the Stalin prize, who was accused of keeping in touch with West Germany and of passing data along to the Ruhr Authority from 1946 to 1949 and who reportedly confessed concealing a rich coal vein "until the Americans come." The other was the director of the Martin Hoop mine, where 48 miners were killed and 30 injured in a disaster in April, 1952.

Russian coal production this year will be more than 320,000,000 tons, or 93% more than prewar 1940, according to a statement published last month in Pravda, the official Communist Party Moscow newspaper.

A research laboratory specially designed for developing industrial and other uses for anthracite is being set up by the Glen Alden Coal Co. on the site of its old Hollenback mine in Wilkes-Barre, Pa. Named to head up the new research facilities was Dr. George A. Brady, formerly associated with the Mellon Institute of Research, Pittsburgh, where he was active in research on acid mine drainage and combustion of gaseous fuels.

PAYLOADER *WORKS ANYWHERE*

4-WHEEL DRIVE GIVES TRACTION, MOBILITY AND VERSATILITY!

Dig! Backfill! Carry! Spread! Lift! Pull! Push! — all these operations are everyday tasks for big versatile "PAYLOADERS" — makes them valuable for small or large mines — in the pit, at plants, at tipples, in yards.

These "PAYLOADERS" feature large pneumatic tires, 4-wheel-drive, proper weight distribution and power-boosted steer. Other outstanding advantages are full, double-acting hydraulic bucket control and four speeds in *both* directions. They will travel in either direction from a slow, powerful crawl up to 20 miles per hour. Sales *and* Service are available from 200 "PAYLOADER" Distributors in the U. S. and Canada. See yours for full details or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.

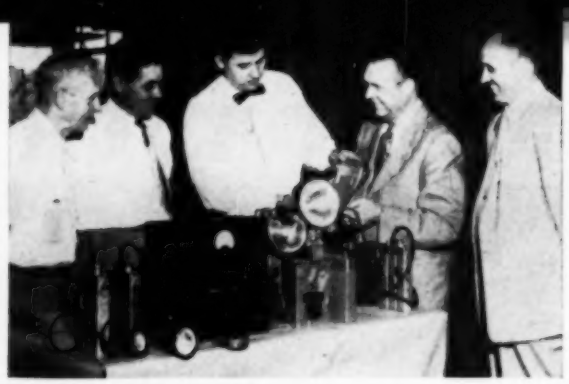
Power-boosted steer for easy handling in sand and mud

Big tires and 4-wheel-drive for traction and flotation

Travel Speeds up to 20 MPH

PAYLOADER®

THE FRANK G. HOUGH CO. Since 1928



COAL MEN ON THE JOB . . . Kentucky Safety Directors Tour Pittsburgh Plant

AMONG the safety directors of several mining companies in the Big Sandy-Elkhorn region and others who toured the research and manufacturing facilities of the Mine Safety Appliances Co. at its main plant in Pittsburgh late in August were: Ray Spears (left), Princess Elkhorn Coal Co.; Marshall E. Prunty, Consolidation Coal Co. (Ky.); Charles Myers, assistant to the manager of MSA's mining department; W. E. Knight, Charleston (W. Va.) newspaperman; C. P. Wolfe, Pond Creek Pocahontas Co.; Vic W. Buys, district manager for MSA's mining department; Arthur Bradbury (left, right photo), Inland Steel Co.; Harry McCarty, Clear Branch Mining Co.; James Fleming, Elk Horn Coal Corp.; Everett White, assistant manager of MSA's mining department; and J. H. Mosgrove, Big Sandy-Elkhorn Coal Operators' Association.

REPUBLIC ROOF BOLT—*A ¾-inch rolled-thread bolt with square-head and forged washer for additional bearing surface. May be used in combination with roof channels, roof ties, roof plates or angle washers.*

REPUBLIC SLOTTED ROOF ROD—*A one-inch rolled-thread rod with slotted end to take wedge. Furnished with hex or square nuts and various size roof plates.*

Republic

Mine Roof Bolts

Two Types for Safer Mining Operation!

To help mine operators minimize the danger of roof-fall accidents, Republic makes two types of roof supports—the square-head bolt and slotted roof rod. They may be used for vertical or angle bolting depending on type of strata encountered.

All the qualities of the Upson Line of headed and threaded products are featured in Republic Roof Bolts. Shanks are tough and sturdy to withstand shock and vibration. Threads are clean, sharp and accurate for full-strength bolting-up. Nuts and bolt heads are square-faced for snug wrenching with less chance for slipping or deforming.

Republic Roof Bolts are made in a variety of lengths from 18 inches to 90 inches—special lengths on request. Write us for additional information.

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Other Republic Products Include Machine, Tank and Carriage Bolts • Lag and Cap Screws • Track Bolts and Spikes • Pipe, Sheets and Wire

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RUGGED DEPENDABILITY

always our GOAL!

Cincinnati Coal Cutting Equipment has enjoyed an enviable reputation for more than a quarter of a century for rugged dependability under all cutting conditions. It has always been Cincinnati's goal and always will be to produce dependable equipment that has *what it takes* to out-cut . . . out-last and out-perform all other cutter chains, bits and bars. And, dependability with Cincinnati Mine doesn't stop with its equipment . . . there's a plus factor that involves a Personalized Service starting at the Home Office and including conveniently located Cincinnati Mine Representatives always at your service. Why not profit from our many years of experience . . . let us hear from you.

the **CINCINNATI MINE MACHINERY CO.**
CINCINNATI 25, OHIO

NCA Meeting Report

Begins on p 140

mendations to achieve this goal, pointing up what each company can do in its own territory.

Mr. Griffith also reported that the staff of Coal Heating Service Division now devotes a large part of its time to sales engineering and promotion of off-track and small-industrial markets. In this field, CHS has analyzed fuels used in public schools, established modernization programs in local plants, promoted local engineering services and fought to keep present customers on coal.

Plans of the Marketing Committee for the immediate future in the on-track market include the following, Mr. Griffiths said:

1. Among sales organizations of individual producers, stress the usefulness of BCI's case-history advertising, as well as the new booklet titled "Burning Bituminous Coal the Modern Way," in key market areas.

2. Create new regional organizations, like the Minute Man Committee now functioning effectively in the northwest dock territory.

3. Provide salesmen with more helps in persuading school authorities to burn coal, especially such helps as the booklet titled "Coal Heat Saves Tax Dollars in Public Schools."

4. Spend more money, especially for sales engineers, in the on-track market.

Turning to the Sales Engineering Council, now set up experimentally in Illinois, Indiana and Michigan with the cooperation of the American Retail Coal Association and local retailer, Mr. Griffith said that the aim is to fight for business in commercial and small industrial plants. The office already is swamped with calls for help and advice, he said.

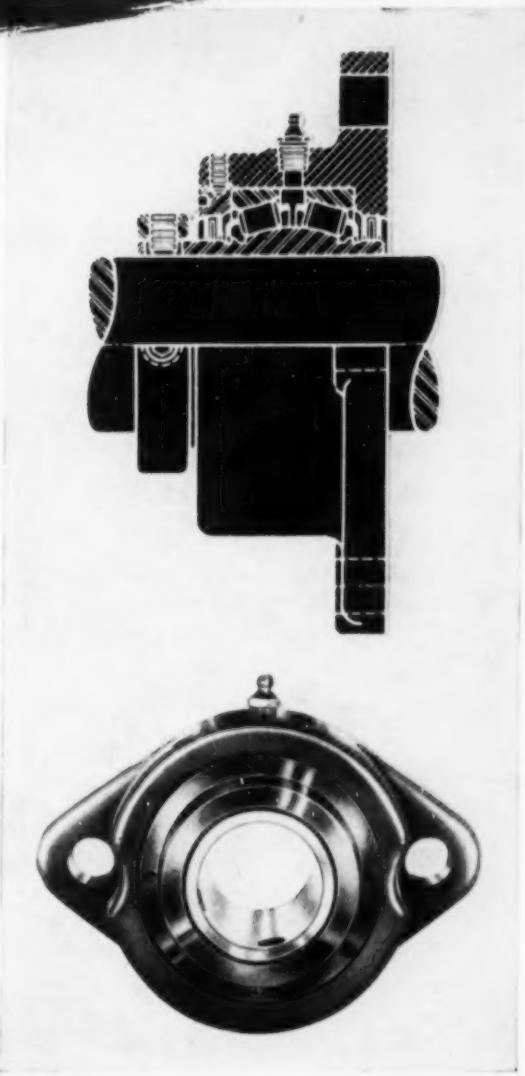
HOW RESEARCH PAYS OFF

"Three-fourths of the profits of I. E. du Pont de Nemours in 1952 came from products that grew directly from research," said Dr. A. Allan Bates, vice president—research, Portland Cement Association. Dr. Bates, guest speaker at the Tuesday afternoon session, developed the theme, "How Research Supports Industry." The coal and cement industries are alike in that they both are indispensable, both are extractive, both produce an intermediate product and both have powerful, alert and progressive competitors, he said.

The starting point for research is a philosophy that calls for cheap, easy and effective availability of the product, with the consumer benefiting in the end, Dr. Bates declared. Research must discover the facts about the product and its uses and must show the customers how to get the most from the product.

Dr. Bates pointed out that 90% of his association's research is aimed at problems of the consumer and that his association goes out to seek problems instead of waiting for consumers to bring problems in. He explained also that for every dollar spent on research, the Portland Cement Association spends

4 good reasons to CHANGE TO ROLLER BEARING CHAIN CONVEYOR HEAD UNITS



GREATER CAPACITY

Link Belt double row self-aligning roller bearings give 8 TIMES sleeve bearing Capacity, 2½ TIMES ball bearing Capacity.

LESS MAINTENANCE

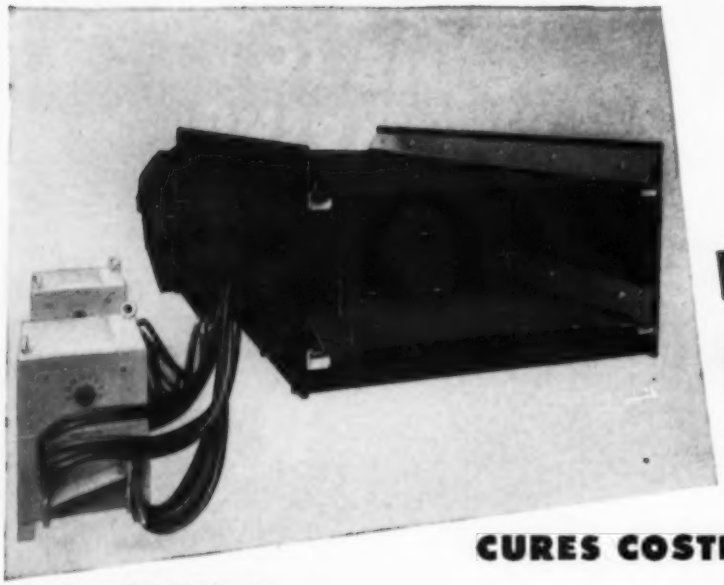
Outer race or rollers not exposed to dirt. Pressure relief lubrication fittings prevent excess grease. New resisto felt seal keeps grease in, dirt out.

LONGER LIFE

Rugged malleable casting. Threaded end cover permits thrust loads taken directly against bearing. Extended inner race provides large wearing area.

EASY INSTALLATION

Distance between bolt holes identical to present sleeve bearing units. Two shaft sizes S-207978—1 15/16 and S-207989—1 11/16. Slide unit on shaft—bolt to frame—turn down set screws which lock inner race to shaft.



HEATING NOT BEATING

CURES COSTLY SCREEN BLINDNESS

photo courtesy of Hewitt-Robins, Inc.

The practice of beating blinded screens, a temporary cure at best, runs up labor cost and causes excessive screen failure. Hanco Screen Heaters forever eliminate costly, inefficient sizing resulting from blinded screens.

SCREEN HEATING REDUCES SIZING COSTS

1. Labor cost is cut by elimination of cleaning labor!
2. Screen life is greatly extended for it is no longer damaged by manual cleaning!
3. Sizing is more accurate and faster for processing equipment can be operated at full capacity!

(Every Hanco installation has paid for itself in less than a year!)

EASY INSTALLATION ON ALL SCREEN MAKES

Hanco electric screen heaters are furnished as a complete kit—heater unit, lead cables, copper distribution and feed bars and skirt boards. All necessary small parts and complete instructions are included. Hanco units are designed to match original fittings. Speedy installation can be made by competent maintenance personnel.

HANCO QUICK-CHANGE ASSEMBLY

Available in five styles, Hanco quick-change assemblies assure easy cloth changes. Special skirt boards or tension rails incorporate a wedge type copper distribution bar that is bolted to but insulated from the rail itself. One of the five assemblies shown below is sure to fit your make of screen. Cloth changes are as easy or easier than on an unheated screen.

A-8074

HANCO SCREEN HEATER ADVANTAGES

1. Hanco heaters have a wide application for they heat brass, plain, stainless and monel steel screens.
2. Unique tap changing device allows screen temperature adjustment under load. This means added economy, for you can quickly adjust to seasonal or load demands.
3. Heater terminals are readily accessible for inspection or adjustment.
4. Compact heater units can be floor, wall or ceiling mounted.
5. There is always positive direct contact with the hook strip of the screen cloth.
6. All electrical contacts are shielded from abrasion.
7. Cloth changes are as quick and easy as they are on unheated screens.

HANCO HEATERS ARE AVAILABLE ON MOST NEW SCREEN EQUIPMENT

Send today for descriptive bulletin

Hanco

the pioneer electric screen heater

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$10 to promote discoveries and developments among consumers. Industry on the average spends some 2% of its gross income for research. The range includes 13% for aircraft, 6% for petroleum and 0.2% for cement. But he pointed out that bituminous coal spends only 0.02% of its gross income for research.

Outlining the essentials of an effective and productive research program, Dr. Bates named the following elements:

1. All members of the association must support research, not just those who choose to.

2. Funds and operations must be set up on a long-range basis, with a cushion in appropriations to assure continuation of research in years when business is slow.

3. Objectives must be clear at the start.

4. Operations must be adventurous. In other words, start with a hypothesis; estimate the gains if the hypothesis proves to be right; subject the hypothesis to tests to see if deductions are right; be willing to take risks.

5. Attention must be kept alert. Researchers must not expect to prove every hypothesis or achieve every goal. But many profitable discoveries turn up unexpectedly as a researcher pursues a goal. Eyes must be kept open for such discoveries.

6. Researchers and their supporters must be patient. They must not expect this year's discoveries to come from this year's appropriations.

7. Everybody must benefit by the results of research—producers and customers alike.

SAFETY—BETTER THAN EVER

"The year 1953 promises to be the all-time low in coal-mine accidents," said S. Austin Caperton, chairman, NCA Safety Committee and president, Slab Fork Coal Co. Reciting activities of his group in the past year, he said that NCA's Safety Division has maintained constant contact with the Bureau of Mines and the various state mining departments and has helped member companies solve problems arising under the Federal Coal Mine Safety Act. In addition, the Safety Division has cooperated in staging some 20 first-aid and mine-rescue contests.

Mr. Caperton reported evidence of growing cooperation among NCA, the Bureau of Mines, state mining departments, the UMWA and private safety organizations. He pledged that the Safety Division will continue its efforts to cooperate.

At the banquet meeting Thursday evening, Sen. Everett M. Dirksen (R.-Ill.), speaking on "The State of the Union," developed the theme that economic, industrial and social progress in the United States grows from freedom and that the task of the present generation is to preserve that freedom.

IMPROVING LAND AND WATER

"Stream pollution has become equally important with land use in our work," said Mr. Kelce, chairman, NCA Land

and Water Use Committee. He explained that because the scope of the committee's work has been extended to include water resources as well as land, the name of the group has been changed accordingly. Mr. Kelce was the first speaker at the Wednesday morning session, with H. C. Woods, chairman of the board, Sahara Coal Co., presiding.

Listing the operations of his committee and of the Land and Water Use Advisory Committee, Mr. Kelce cited the following accomplishments:

1. Allocation of $7,100 from NCA funds to insure completion and publication of a Mellon Institute report on mine-water-pollution abatement.

2. Field trips by the advisory group to inspect strip-mined areas and other industrial sites, notably in Idaho and Minnesota.

3. Achievement of a tempering of the language in a resolution prepared by the Outdoor Writers' Association, which originally would have gone too far in correcting abuses of mining claims.

4. Help to the Illinois Coal Strippers' Association in successfully fighting zoning restrictions that would have prohibited or restricted strip mining in Illinois.

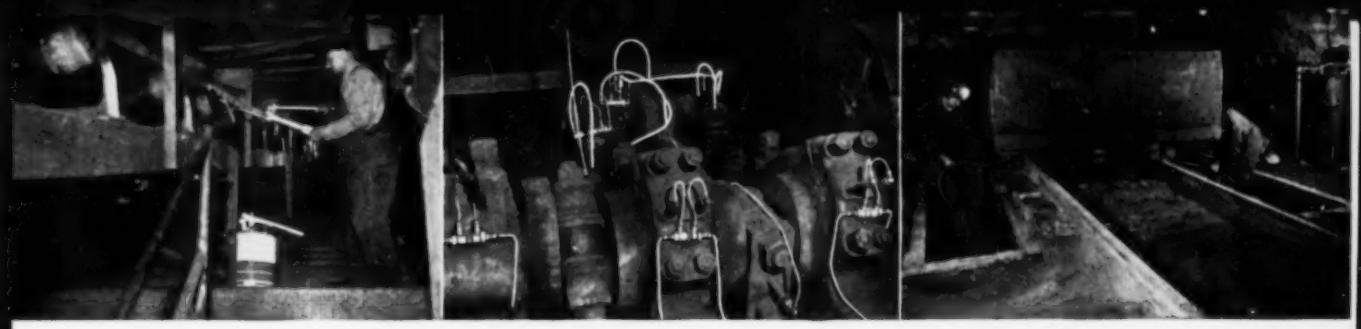
FIGHTING FOREIGN OIL

"We cannot act as a standby source of fuel for oil and gas and at the same time remain financially healthy enough and sufficiently equipped in our properties to take care of a national emergency" without constructive relief from the flood of foreign residual oil, said Dr. R. E. Snoberger, chairman, NCA Natural Resources Committee and president, Truax-Traer Coal Co. In the absence of Dr. Snoberger, his report was read by Mr. Pickett.

Dr. Snoberger traced the work of his committee in support of the Simpson bill to limit oil imports, pointing out that other groups had joined the drive, including coal-carrying railroads, lead and zinc, wool, textiles, small business, railroad brotherhoods, the UMWA and the independent oil industry. Result of this cooperative program was formation of the Foreign Oil Policy Committee, he explained. "We had a hard time getting those people in the coal industry who were most concerned to appear and testify" on the Simpson bill, he said. The only two organized bodies in Congress who heard both sides of the oil-import story favored the bill. Those two bodies were the Ways & Means and the Rules Committees. Defeat of the measure in the House of Representatives, however, points to the need for doing a better job of organization and of presenting the industry's case when Congress convenes in January, Dr. Snoberger said. Plans now being shaped include better organization of related industries, local and national coverage, better divisional organization, pamphlets, television and radio. "It will take money and work to put it over," he warned.

CURBING OIL AND TAXES

"The Republican party will not fail



Conveyor Belt Rollers get positive lubrication with a Model 6679-J high pressure lever gun. Pressure flushes bearings completely, gives them protection from abrasive coal dust. Alemite Loader Pump fills gun quickly, efficiently.

Alemite Centralized System, shown here on a shaker assembly, lubricates all bearings at once, gives constant protection with *no downtime!* Avoids the possibility of missed bearings. Effects important savings in production, maintenance, lubricants!

Save 23.9 man-hours for every hundred pounds of grease applied! This is an important saving. Even more important is the complete protection essential machines receive from Alemite power lubrication methods and equipment!

From Face to Surface to Siding

THE MOST PUNISHING ROAD IN THE WORLD!

...and Alemite "Friction Fighters" guard every step of the way!

Slashing costs...boosting tonnage!

Few industries present the lubrication problems that confront coal mining and processing operators daily. Every day, every hour is a grueling test of machine endurance. Dampness, dust, abrasive grit, heavy loads threaten bearings at every turn. Yet, all-important tonnage depends on their unfailing operation. Keeping that tonnage rolling by protecting these essential bearings is the job performed by Alemite "Friction Fighters"—efficiently and at low cost!

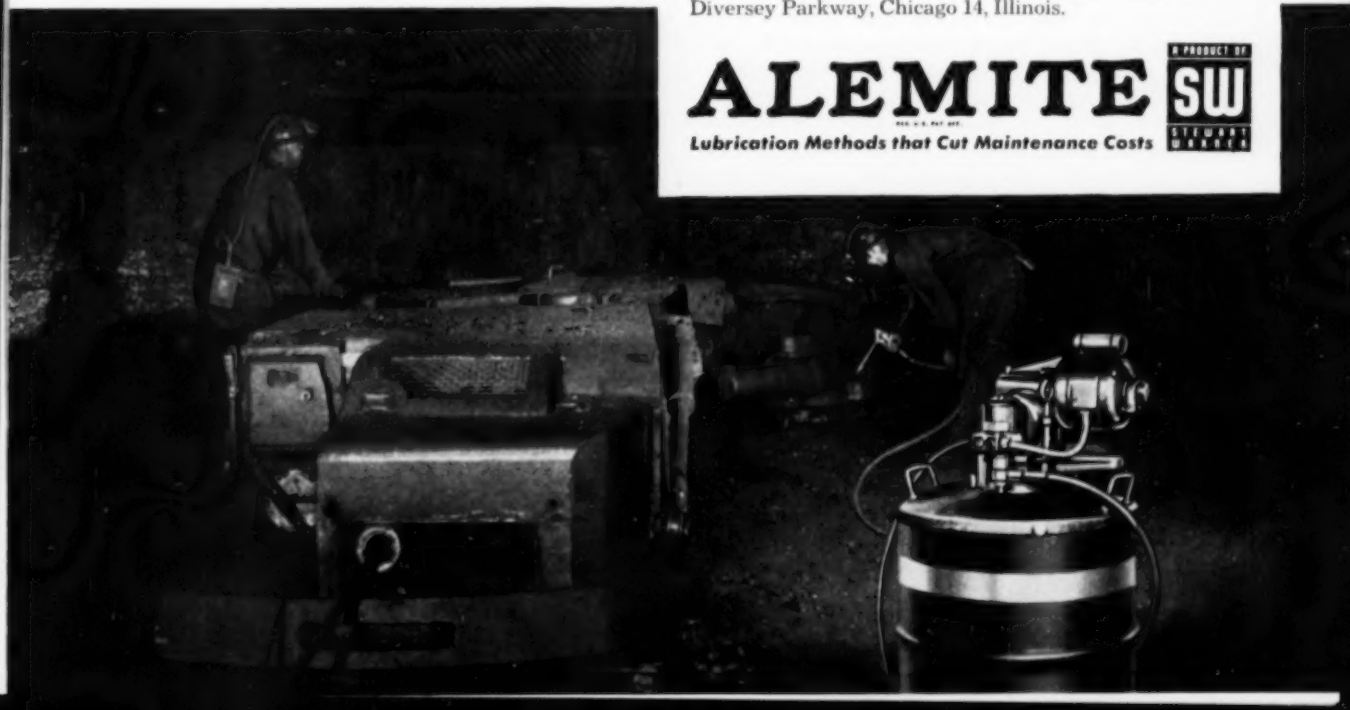
Deep in the mine where machine failure means costly delay at best, and catastrophe at worst, Alemite has proved itself best on all types of machines. Proved most dependable for all types of machine motion. Chain drives, reciprocating parts, conveyor drives, all shafts, heavy or light, any and all mining and processing equipment is best served by Alemite. The proof is in the overwhelming majority of major plants and mines that use and depend on Alemite equipment and lubrication systems.

Alemite slashes downtime—boosts tonnage! Alemite methods of loading, transferring and applying grease reduce downtime and chances of bearing failure. Keep lubricants "refinery clean," give bearings positive protection. Find out how Alemite can help you. Write Alemite, Dept. E-113, 1850 Diversey Parkway, Chicago 14, Illinois.

ALEMITE

A PRODUCT OF SW STEWART-WARNER

Lubrication Methods that Cut Maintenance Costs



In its traditional responsibility to the workers and businessmen of America—the responsibility of protecting their jobs and our industries from unfair foreign competition," declared Rep. Richard M. Simpson (R.-Pa.). Mr. Simpson, guest speaker at the Wednesday morning session, is the author of the bill that would, among other things, place a quota on imports of residual oil. His subject was "Federal Legislation and Taxes."

Restrictions on international trade, including tariffs and licenses, are much stricter in other nations than in the United States, Mr. Simpson contended. This is especially true of Venezuela, principal source of residual imports, where the government has set up heavy import duties, quotas and quarantines to protect the domestic welfare. Meanwhile in our own country, Congress has surrendered to the executive branch its constitutional duty to regulate commerce with foreign nations, with the result that imports have reached the danger level and now threaten the national security. Recalling the brownouts and blackouts during World War II, when submarines cut off our foreign supplies of oil, Mr. Simpson said "there must be no let-up in our legislative efforts to curb these noxious imports." Since voluntary curbs have failed to work and since imports cannot be held to sensible limits by the executive branch, federal legislation is the only remedy, he stated.

Turning to taxation, Mr. Simpson predicted substantial tax reduction during the next fiscal year, though probably not so great as some people have been led to believe. He also held out hope that percentage depletion rates for coal will not be reduced below the present 10%, though that figure admittedly is lower than it should be. Mr. Simpson said he will fight to freeze social-security taxes at their present level, making concessions to industries with high labor costs like those of the coal industry, abandonment or modification of double taxation on corporate dividends, more reasonable regulations for depreciation and holding the FPC to policies that will reserve natural gas to the superior uses it is best suited for.

LEGAL QUESTIONS AFFECT COAL

A federal anti-trust suit filed in April against five major oil companies places on those companies, who are the largest importers of residual oil, "an obligation to account to the court for their international trade practices," said R. E. L. Hall, NCA counsel. Mr. Hall reviewed recent and pending legal developments affecting coal. Turning to the Phillips Petroleum Co. case, Mr. Hall said that the recent decision of the District of Columbia Circuit Court forces the FPC to keep the price of natural gas down to the cost of production, which often is below the fair commodity value. The result of this decision is that gas in many areas undersells coal and therefore is being wasted for inferior purposes under boilers that would be better served by our abundant reserves of coal.

Mr. Hall reported that high safety

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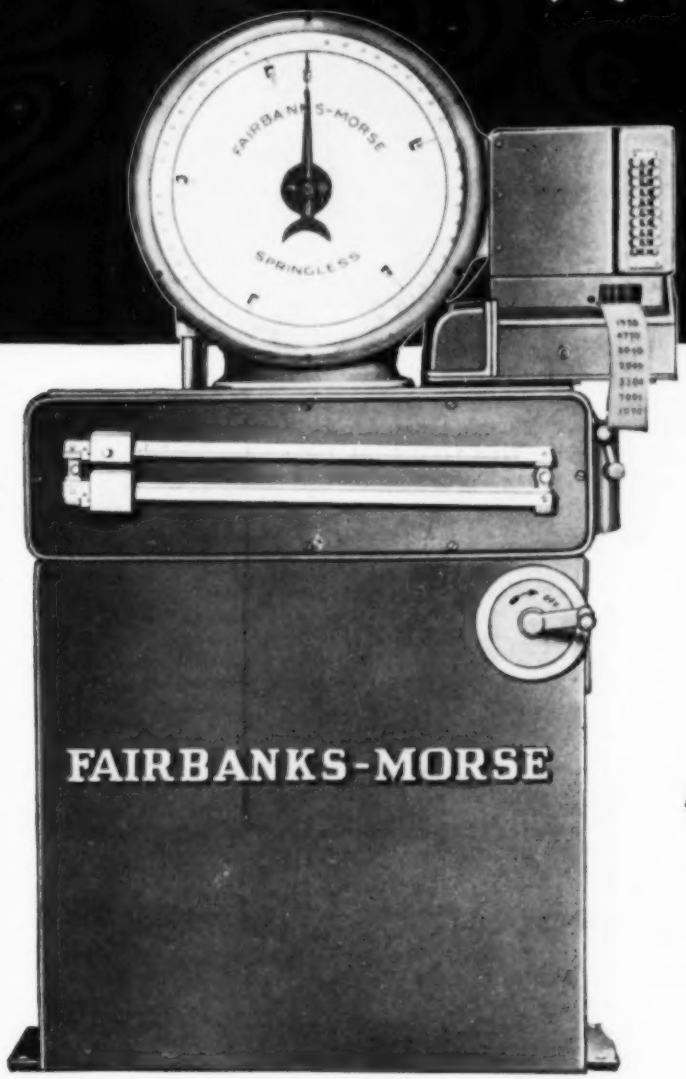

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standards are not always observed in establishing storage facilities for natural gas near coal mines and commended the steps taken by coal operators in Pennsylvania and elsewhere to obtain adequate legislation governing gas-storage facilities.

HOW TO SELL MORE COAL

"Nothing ever happens until somebody sells something," declared Arthur Harrison Motley, president, Parade Publications, Inc., as he spoke to the luncheon session Wednesday on "Better Selling for Better Living." That session and the afternoon meeting immediately following were guided by Mrs. Lillian M. Gildroy, president, Bair-Collins Co., the first woman ever to preside at an NCA meeting.

The keys to better selling, said Mr. Motley in an address that drew rounds of applause from the convention, are as follows:

1. Market research—Find out what people want, what will sell. In this Nation of plenty, nobody needs anything. But people do want things, and it is the business of market research to find out what they are. And it doesn't take a fancy organization or a lot of money to find out.

2. Service and courtesy—Help people use the product better. Find out how they are using it now, show them new ways to use it and be on the lookout for ways to use it that you hadn't thought of. Polish up office and telephone courtesy. Make each phone call or office call an opportunity to serve—and sell.

3. Sales training—Learn the traits that customers like in salesmen and tell your salesmen about them. Sell your salesmen on the value of your product. Learn the frustrations and disappointments of your salesmen and give them the advice and the tools that will overcome those frustrations and disappointments.

4. Selection of salesmen—Use good judgment in picking men to sell your product. After they are selected and trained, hold them to your high standards.

TRAINING MEN FOR COAL

The Vocational Training and Education Committee of NCA develops friendly relations with schools and colleges, tells students the basic facts about the mining and use of coal, offers advice about studying for employment in the industry and encourages coal companies to establish scholarships for young men, said Henry C. Woods, committee chairman and chairman of the board, Sahara Coal Co. In the past 12 mo, the committee has visited Pennsylvania State College, the University of Kentucky and the University of Minnesota, and M. D. Cooper, director, Mining Engineering Education, has visited nine colleges and universities offering mining-engineering courses, Mr. Woods reported. Asking for the sympathetic interest of coal producers in schools and colleges and in students themselves, Mr. Woods stressed the need for more scholarships to be made available to young men

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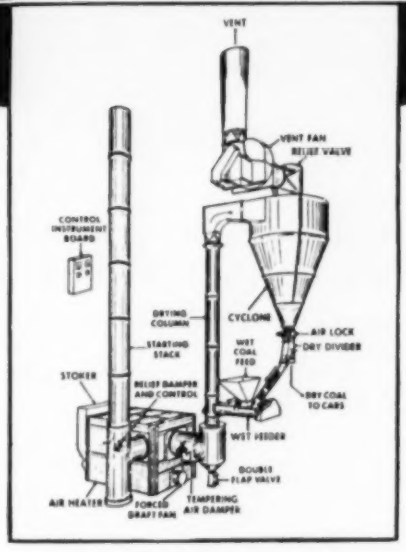

Typical Flow Sheet of C-E Raymond System of Flash Drying Fine Coal Sizes

COMBUSTION ENGINEERING, INC.

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studying mining engineering and the benefits of providing those young men with summer work in the mines.

FIGHTING HIGHER RAIL RATES

The Interstate Commerce Commission has authorized freight-rate increases extending to the end of 1955 in spite of the organized and outspoken opposition of the coal industry, reported L. E. Tierney Jr., chairman, NCA Interstate and Foreign Commerce Committee and president, Eastern Coal Corp. In Mr. Tierney's absence, his report was read by F. F. Estes, of the NCA staff. In granting the extension, he pointed out, the ICC did not release any report setting forth the premises on which its decision was basel until several days later. The committee now is seeking ways to obtain sorely needed relief. The ICC has not yet released any report of action on proposed increases in rates on fly-ash—an increase actively opposed by the committee. The committee also has been active in opposition to development of the St. Lawrence Seaway and to the so-called time-lag bill, which would give the railroads virtual authority to increase rates on a temporary basis without full ICC hearings, Mr. Tierney reported.

MEMBERSHIP AND FINANCES

In view of losses within the industry as a whole, net loss of membership in NCA has been small, according to Harry LaViers, chairman, NCA Membership Committee and president, South-East Coal Co. Membership now represents 200,000,000 tons in 23 states. The active prospect list for membership includes some 200 commercial companies with total annual production of about 50,000,000 tons. Improvement in the coal business doubtless will produce an increase in membership, Mr. LaViers predicted.

John L. Kemmerer Jr., NCA treasurer and vice president, Wise Coal & Coke Co., reported a net deficit of $45,199.81 in the year ended Sept. 30, against a deficit of something over $100,000 in the year preceding. Working capital now stands at $1,896,215. Budget for fiscal 1953-54 is $1,511,658.

Among other resolutions adopted in the closing minutes of the convention were the following:

1. Support for quantitative limitations on imports of residual fuel oil as set forth in the Simpson bill.

2. A protest against bad-order railroad cars and a plea for clean and fit cars.

3. Opposition to imports of natural gas from Canada and Mexico.

4. Support for moves to reserve natural gas to superior purposes, agreement that the natural-gas industry should be granted a fair commodity price for its product and a request that Congress frame and adopt a wise national fuels policy.

New Books for Coal Men

More Coal Research

Annual Report of Research and Technologic Work on Coal and Related Investigations, Fiscal Year, 1952, by R. L. Brown and W. H. Ode. The book includes sections on coal characteristics, mining, preparation, transportation and storage, utilization, carbonization, gasification, synthesis gas and synthetic liquid fuels. Though based on earlier publications, this report contains some hitherto unpublished data. *USBM, I. C. 7663. 67 pp. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Water—Threat to Anthracite

Barrier Pillars in the Southern Field, Anthracite Region of Pennsylvania, by S. H. Ash and H. D. Kynor. With data on 35 barrier pillars in the southern anthracite field, which ultimately must produce the bulk of the Nation's tonnage, the authors conclude that flooding will seriously threaten that field's future unless remedies are undertaken. The proposed Conowingo tunnel system would reduce annual pumping costs from $1,100,000 to $20,000 and would stretch the life of the field from 200 to 420 yr, they contend. *USBM, Bulletin 526. $1, Supt. of Documents, Government Printing Office, Washington 25.*

ME-MMA Holds Meet Begins on p 152

tain permissibility were stiff because the same parts and the same wiring diagrams as in the original were required. Such standards were set up because of possible deviations by companies which, it was felt, could bring about disasters. The Bureau came to recognize that some certain changes did not present hazards and a conference between manufacturers and the USBM was called to determine what changes would be permitted. As a result, changes are considered for approval so long as they do not overload electric parts.

In conclusion, Mr. Walker listed the following steps as aids in increasing safety: (1) manufacturers should build in equipment the greatest protection possible; (2) users should accept the responsibility of maintaining equipment in proper conditions; (3) the safest way should be made the easiest way as that is the natural way; and (4) reporting of hazards by others not connected with electrical maintenance should be encouraged to aid maintenance.

Manufacturing and Research

The fundamental purpose of a machine is primarily as a money maker, Mr. Barrett said, and the object of using a machine in a coal mine is to produce coal at a lower cost. In the manufacture of mining machinery, some compromises must be made in design because of economic and physical considerations. A major problem confronting the manufacturer is building a machine that will fit the confined space in a mine, and yet be flexible and practical.

Manufacturers' maintenance interests are similar to those of maintenance men at the mine, Mr. Barrett emphasized. Well trained mechanics and electricians at the mine are key men in the successful operation of a new-type machine such as the continuous miner. Better lubrication, adequate and properly chosen spare parts, proper placing of spare parts near the machine and a good preventive maintenance program are essential to get the most from mining equipment.

Regular servicing of units is necessary if down time is to be reduced. As an example, Mr. Barrett cited that after each 30,000 tons of coal produced by a continuous miner, there should be a complete rebuilding of the main gear case. In addition, complete general overhauls should be made at regular intervals to assure maximum production.

Operations and Maintenance Men

Few mining companies consult their master mechanic when a new plant is to be built or new equipment is to be selected, Mr. Hanson said. However, the Pittsburgh Coal Co. has found it profitable to call on men from the president on down to the lowest mechanic to get ideas. It is necessary to understand the problems of men using the equipment if wise decisions are to be made.

Standardization of equipment and

parts is another practice that aids maintenance. Many parts have been standardized to fit several units and, as a result, parts inventory is lower, Mr. Hanson explained.

For more effective maintenance, Mr. Hanson pointed out, the Pittsburgh Coal Co. classifies a maintenance man according to the jobs he can do and assigns him to work for which he is trained. There are specialists in shuttle cars, loaders and similar equipment. These men handle rebuilding scheduled on a regular basis. Complete rebuilding jobs are carried out on an average of once every 8 mo.

There is a significant trend away from doing large repair jobs at the face, Mr. Hanson noted. The number of spare units available for replacement of units to be rebuilt varies from company to company. Some smaller operations have one spare for two or three units, while some larger producers may have one spare unit for each four or five units.

The answer to the problem of good maintenance is how well a company is equipped to do the job. There must be a satisfactory place to do the job, Mr. Hanson declared.

AIEE Scans Progress

Begins on p 144

HELP ON BREAKER SETTINGS

Donald J. Baker, mining representative, I-T-E Circuit Breaker Co., and Clyde L. Brown, mining engineer (electrical), U.S. Bureau of Mines, both of Pittsburgh, presented a comprehensive study they worked out indicating the proper overcurrent settings for DC feeder breakers (multiple and stub-end) for 216 combinations of feeder size, trolley-wire size, distance, rail weight and voltage. The tables include resistance figures for the copper, the track and the total circuit. The tables provide, for the first time, a means for determining proper breaker settings for any usual conditions without the necessity of complicated calculations. (*See pp 86-89 of this issue for the complete tables and their explanation.*)

GROUND CIRCUITS WARNING

L. H. Harrison, mining engineer (electrical), U.S. Bureau of Mines, Birmingham, in a short paper dealing with the effect of reactive components in the measurements of ground circuits, concluded that circuits through earth strata cannot be depended upon to trip electrical equipment protective devices even though conventional ohmic tests indicate they should. Because of reactive components, measurements of ground impedance should be made with power of the same frequency as the circuit to be protected.

POWER FOR CLEANING PLANTS

Application of electrical equipment in coal preparation plants, by W. R. Morton, General Electric Co., Schenectady, dealt with power requirements, motor voltages, transformer substations, low voltage grounding, switchgear, capacitors, control equipment and cable selection. The

power requirement in kva can be considered at 65% of the connected horsepower. Upper size limit for 440-v motors is determined by voltage available without stepdown transformers. If 2,500 v is available, use 440-v motors up to 150 hp and 2,300-v motors for 200 hp and above. For 4,160 v, use 440-v motors up to 250 hp and 4,000-v motors for 300 hp and above. On power above 4,160-v, use 440-v motors up to 250 hp and 2,300-v motors for 300 hp and above.

Mr. Morton stressed recent trends toward using wye-connected 440 v with grounded neutral and cited many advantages of that system. Capacitor kvar on a transformer substation should be kept below two-thirds of the rating to avoid the possibility of resonance. Answering a question, he said he favors grouping controls in dust-tight rooms because starter cover gaskets can dry out and admit dust.

CONTINUOUS MINERS

That a properly designed system for conventional mining will serve a continuous mining system with very little modifications was one of the conclusions of R. M. Hunter, electrical engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa., in his paper, "Power Supply for Continuous Mining Machines and Associated Equipment." Typical of a highly cyclic machine such as the Joy continuous machine is a root-mean-square requirement of 100 kw and peaks of 215 kw. On the Colmol, operating power is practically constant at 100 kw. The voltage regulation figure of 20% accepted by the mining industry is satisfactory for a continuous mining installation. For one continuous miner, a 150-kw substation is required; for two miners, a 300-kw substation; for four miners, a 500-kw substation.

Answering questions, Mr. Hunter said use of a loading machine to pick up loose coal behind a continuous miner adds but little to the power requirement. Power supply problems are much less with 500 v and motor troubles have not proved higher, but controllers seem to give more trouble. A few tests, not claimed to be conclusive, indicate about the same energy consumption per ton of coal with the continuous miner as with the conventional loader.

UNDERGROUND TRANSFORMERS

R. L. Schwab, Westinghouse Electric Corp., Sharon, Pa., presenting a paper entitled "Mining Transformers—Their Design and Application," dealt principally with underground transformers and described the three principal types: (1) sealed nonflammable liquid, (2) ventilated dry type and (3) sealed dry type. He said the industry trend for portable duty has been toward the dry type (sealed or ventilated) for reasons of less maintenance, lighter weight, flexibility for integral substations and demonstrated satisfactory service. He presented a comparison table of the three types. Answering a question, he said that in a dusty mine the ventilated dry type should be cleaned every 3 mo by removing the sheet-metal sides and using compressed air.

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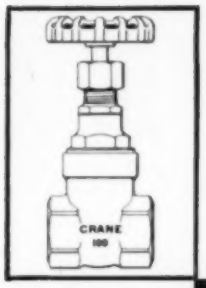

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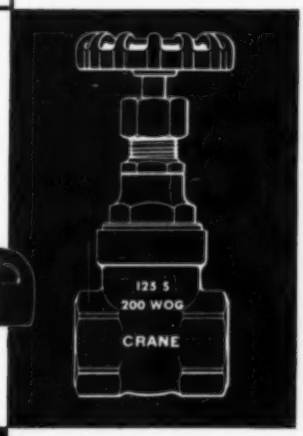

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J. W. Heimaster, Carbide & Carbon Chemicals Co., presented a sound-color film and a brief description of the continuous miner developed by that company. The machine has mined 567 tons in the best 8-hr shift (*Coal Age*, Dec., 1952, p 72). Since Sept. 1, it has been in use at a commercial mine.

DYNAMIC BRAKING BEST

A. H. Huelsman, Industrial Engineering Section, General Electric Co., Schenectady, compared three methods of electric braking for ac drives of mine hoists, these being regenerative braking, reverse power (two motors in opposition) and dc dynamic braking. His evaluation indicated that dc dynamic braking is best from all standpoints. This consists of disconnecting the motor from the power, putting dc into the stator, and regulating speed by varying the excitation and the resistance that dissipates the power generated in the rotor circuit. His paper included speed-torque curves for the three methods.

Answering a question, Mr. Huelsman said that putting dc through all three phases gives 18% greater braking than through two phases but that current is normally put through only two because that gives sufficient braking and provides the highest torque per unit of heating. Mr. Richart commented favorably on the dc dynamic braking method based on his company's favorable experience with it for several years on a 300-hp slope hoist.

LOCOMOTIVE FOR LOW COAL

A locomotive weighing 15 tons but only 26 in high over-all when equipped with 23-in wheels was described by J. W. Brauns, General Electric Co., Erie, Pa. The motors, 95 hp each and permanently operated in electrical parallel, are mounted with shafts parallel to the length of the locomotive. First reduction is a spiral-bevel-type pinion and gear; the second, a spur-type pinion and gear. Control is electro-pneumatic with 10 motoring steps and seven dynamic braking steps. Mr. Brauns stated that in spite of limited dimensions, all of the advanced design features and the sturdy construction of standard locomotives have been built into this new unit.

DESIGNING A DC SYSTEM

"Conversion Substation Location and Equipment" was the subject of a paper by John A. Dunn, electrical engineer, Island Creek Coal Co. This paper, in two parts, was reprinted from the *Mining Congress Journal*, September and October, 1952. Its scope is a detailed coverage of the principal problems in designing a dc system. Demand factors for various seam thicknesses were suggested as follows: 6 ft, 80%; 5 ft, 75%; 4½ ft, 70%; 4 ft, 65%; 3½ ft, 55%; 3 ft, 45%. Diversity factors were given as follows: 2-section load, 85%; 3-section load, 75%; 4-section load, 67%; and 5-section load, 60%.

Answering a question, Mr. Dunn said the rectifiers of his company have positives grounded but he thinks that the negative-grounded system probably

would be less troublesome. H. B. Buckingham, electrical engineer, TCI Div., U. S. Steel Corp., Birmingham, said that with the latest rectifiers there is no advantage in negative trolley. The positive trolley avoids roof and hanger disintegration and avoids the possibility of explosion from metallic sodium. Some of that metal, which in contact with water breaks out in flame, was found in a hanger pipe encrusted with minerals leached out of the roof by negative trolley operation.

PARALLELING CONVERTERS

"Parallel Operation of Conversion Equipment," presented by L. W. Scott, engineer, General Electric Co., Charleston, W. Va., revealed all the tricks in making adjustments to secure satisfactory parallel operation of mining conversion units, selenium rectifiers excepted. He concluded that with proper circuits and proper adjustments, motor generators, converters and rectifiers can be operated successfully in parallel with each other or with either of the other types.

Answering a question, Mr. Scott said that rotary machines operated without an equalizer should be about 1,000 ft apart instead of 500 to 600 ft or less apart.

SHUTTLE CAR WITH CRAWLERS

"A Track-Laying Shuttle Car" was the subject of a second paper by Mr. Brauns. This type of car was introduced by the General Electric Co. in 1950 as the answer to complaints against rubber-tired cars on soft bottoms and in wet mines. Elimination of wheel wells has permitted a wider body bed and wider conveyor to provide larger coal-carrying capacity and greater speed of unloading. On the recent cars, two 70-lb rails have been formed around the discharge end to act as bumpers. The lowest cars to date are 42 in but they can be made considerably less than that. The car has 53 connected horsepower. When the car is used on 500-v power, a No. 3 or No. 4 cable is used; on 250-v power, No. 2 or No. 3 is advisable.

CABLES FOR MINING

Thomas R. Weichel, mining electrical engineer, Hazard Insulated Wire Works Div., The Okonite Co., presented a paper on use and application of neoprene-sheathed cables in mines. Subjects covered were stranding, flexible cords, portable cables, shielded cables with neoprene sheath, mine power feeder cable, lightning protection, methods of suspension, installation methods, terminating practice and neoprene-sheathed trailing cables. The paper included tables of stranding, area of stranded conductors and permissible suspension lengths of neoprene-sheathed 5-kv shielded mine power cable.

Steve Bunish, Anaconda Wire & Cable Co., Marion, Ind., presented a paper on construction and maintenance of mine trailing cables. This paper included a table covering the four principal causes of cable damage. For each cause, Mr. Bunish indicated the evidence of damage and the ways to avoid trouble.

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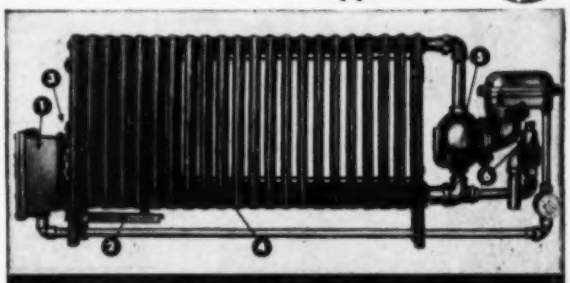

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McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. Gerardi, Vice Pres. & Treas.

Sworn to and subscribed before me this 10th day of September, 1953.

[SEAL] ELVA G. MASLIN.
(My commission expires March 30, 1954)

Nov. Coal Age—77446

Communist machine-gun fire dropped him in combat. But whole blood kept him alive, saw him through the hospital. He thanks you for his life.

She'd been exposed to polio. A new serum, *Gamma Globulin*, made from blood, helped ward off the dread disease. She thanks you for her life.

A tornado whipped suddenly across her home town. She was badly injured by falling debris. But a quick operation, several transfusions pulled her through. She thanks you for her life.

Three grateful people say:

"We're HERE...

because you were THERE!"

Each one of these people is alive today because someone gave blood.

If you've given blood before, you know how easy it is—how quick and painless. And you know what a wonderful feeling it is when you realize that what you've done may give another person his life.

Now you are asked to give blood . . . again and again. And you can do it safely every 3 months.

Because America's need for blood has increased enormously—for our armed forces, for accident and disaster victims at home, for new disease-fighting serums.

Many a life hangs in the balance! Will you help? Call your Red Cross, Armed Forces or Community Blood Donor Center today!

BUSINESS EXECUTIVES
CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLANT BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOODMOBILE MAKE REGULAR VISITS?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM

GIVE BLOOD

...give it again and again

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Advertising men agree – to do a complete advertising job you need the double effect of both Display Advertising and Direct Mail.

Display Advertising keeps your name before the public and builds prestige.

Direct Mail supplements your display advertising. It pin-points your message right to the executive you want to reach – the person who buys or influences the purchases.

More and more companies are constantly increasing their use of Direct Mail because it does a job that no other form of advertising will do.

McGraw-Hill has a special Direct Mail Service that permits the use of McGraw-Hill lists for mailings. Our names give complete coverage in all the industries served by McGraw-Hill publications – gives your message the undivided personal attention of the topnotch executives in the industrial firms. They put you in direct touch with the men who make policy decisions.

Some people have a wrong conception of Direct Mail. There's no hocus-pocus to it—there's no secret formula—nor is there need for an extensive department to plan and execute your mailing program. You don't even need your own mailing lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance in industrial personnel. Our lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nationwide field staff, and are maintained on a twenty-four hour basis.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want.

Ask for more detailed information today. You'll be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.

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for CONVEYOR MINE with 35B MACHINES
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MERRICK COAL CO.
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Used Wet Washer Type
Cleaning Plant.
Capable of handling three to four hundred tons per hour.
W 9177 Coal Age
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WANTED
1—Railroad Scale with Beam
Capacity 150 tons, Section capacity 75 tons, length of platform 60 feet.
Bradford Coal Company
Bigler, Pa.

WANTED
100 KW Diesel Generator
GM Model 3-268A diesel, direct connected to 100 KW Allis-Chalmers D.C. generator.
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90' Boom, twin 6-71 GM Diesel Engines, Long Crawlers, Wide Pads. One available in January 1954 and the other available in the Spring of 1954. These machines in excellent condition. Recently completely overhauled. Real Bargain.
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FOR SALE
Lima 1201 Dragline, Serial No. 4527. New in 1948, one owner, good condition. Address Comet Collieries, Inc.,
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FOR SALE
TIMBER TREATING PLANT
Ideal for low cost effective treatment of mine ties and timbers. Price $2,250.00. Will quickly pay for itself.
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3—200 KW G.E. Motor Generator Sets, 1200 RPM, 250/275 V DC, 3 phase, 60 cycle, 2300 V AC, complete with switchboards and FULL AUTOMATIC AC and DC switchgear. Completely rebuilt. Price only $6750.00 each.

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2—200 KW G.E. late type Synchronous Rotary Converters, HCC-6, Form P, 1200 RPM, 250/275 V DC, complete with switchboards and switchgear and AUTOMATIC reclosing circuit breakers. Rebuilt—$4500.00 each.

1—150 KW G.E. Synchronous Portable Type Rotary Converter, Type HCC-6-150-1200, Form P, 250/275 V DC, complete with three single phase transformers, 2300/4000 V AC. Structural steel field frame and base, structural steel portable trucks, 42" gauge, 34" high. Price $3750.00.

2—300 KW Mercury Arc Rectifiers, mine type, 250/275 V DC, 2300 V AC, FULL AUTOMATIC equipment, 42" gauge portable trucks. Used only a short time. Price $22,500.00 each.

6—8-BU-3E Joy Loading Machines, 250 V DC, low pedestal type, 34" high. Practically new condition. $3500.00 each.

5—29-U Jeffrey 250 volt DC, late permissible type Cutting Machines, on rubber tires.

3—29-U Jeffrey 250 volt DC, late permissible type Cutting Machines, on cat trucks.

4—6-SC Joy Shuttle Cars, cable reel type.

7—5-SC Joy Shuttle Cars cable reel type.

7—5-SC Joy Shuttle Cars, battery type.

Several 14-BU and 11-BU permissible type Loading Machines, 250 V DC.

1—Practically new 12 x 22 Bradford Coal Breaker, complete with housing, bottom hopper, cross supporting beams, V belt pulley and pinion, and motor. New in 1948.

COMPLETELY REBUILT LOCOMOTIVES, 250 VOLT

5—15-ton Jeffrey MH-110.

2—13-ton F.E. HM-829.

2—20-ton Jeffrey MH-77.

1—13-ton Goodman 36-B.

4—10-ton Goodman 34-B.

4—Late type 10-ton G.E. Locomotives with 13-ton equipment, HM-839 4" frame, 32" high, 42" gauge, contactor controls, Timken roller bearing journals, 28,000 series. Practically new.

10—6-ton G.E. HM-835 Gathering Cable Reel Locomotives, 30" high, all in 15,000 series 2" armorplate frame, outside steel tired wheels, 42" gauge. $1800.00 each.

Large selection of Aerodyne Fans, Single and Double Drum Slope, Shaft, and Drift Hoists, Steel Tipples Washers, Mine Cars, Belt Conveyors, and many other items too numerous to mention.

MAIL US YOUR INQUIRIES FOR LATE TYPE REBUILT EQUIPMENT.

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230 VOLTS DC MINING MACHINES 50 H.P.
10—Goodman 412 Permissible, 7' cutter arm.
5—Jeffrey 35L—Low Vein 6½' cutter arm.
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1—Goodman 112 Universal 5' cutter arm.

HOISTS
1000 H.P. Nordberg DD, 3/60/2200
600 H.P. Vulcan DD, 1500 RPM, 3/60/2200
500 H.P. Vulcan DD, 1000 FPM, 3/60/2200
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300 H.P. Vulcan SD, 500 FPM, 3/60/2200
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200 H.P. Vulcan DD, 300 FPM, 3/60/440
150 H.P. Wellman-Seaver-Morgan SD, 500 FPM, 3/60/440
112 H.P. Flory SD, 400 FPM, 3/60/440
80 H.P. Vulcan SD, 400 FPM, 3/60/440.

MG-SETS
500 KW GE, Syn., 720 RPM, 250/275 volts, 2200 volts.
300 KW Ridgeway Syn., 720 RPM, 300 volts, 2200 volts.
300 KW West., Syn., 1200 RPM, 275 volts, 2200/4000 volts.
200 KW West., Ind., 900 RPM, 275 volts, 2200/4000 volts.
200 KW West., Syn., 900 RPM, 250 volts, 2200/4000 volts.
200 KW Ridgeway Syn., 1200 RPM, 275 volts, 2200 volts.
150 KW Ridgeway Syn., 900 RPM, 250 volts, 4000 volts.
120 KW GE., Ind., 900 RPM, 275 volts, 2200 volts.

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58 BH Champion diesel power, 38' mast, new condition, used about 1500 hours.

Ingersoll Rand Quarry Master diesel power, 6" holes; excellent condition.

LS85 Linkbelt ¾ yard diesel shovel. Fine condition.

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HANDY PORTABLE SUBMERSIBLE PUMPS
Mfg. by Northern Pump Co. — All bronze — 200 GPM at 25' head. Motor 2.5 HP — 115 volts DC — 19 amp. Complete with 75' of watertight cable. Waterproof across-the-line starter.

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New and used.
The Ironton Engine Company
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WIRE ROPE
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2—1,250 Ft. Pcs. 1-⅜" Roebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

SEEING IS BELIEVING

Come and inspect the largest stock of good used modern mining equipment, copper trolley and feeder cable, transmission wire, rail and supplies east of the Mississippi. For true money saving values contact J. T. FISH.

We Sell the Best and Scrap the Rest

SUBSTATIONS & DIESEL PLANTS

Two 300 KW, G.E. HCC-6 Rotary Converters.
One 500 KW, 6 phase Westinghouse Converter.
Also six 200, 150, and 100 KW rotaries in stock.
All complete with transformers.
100 KW Diesel Plants. All 250 volt DC.

CUTTING MACHINES

7 Baby Goodman 212AA, 250 volt DC.
10 Goodman 512AA with bug dusters.
Also Standard and Universal, AC & DC.
Joy 11B, 7B—Jeffrey 35L, 35B, 29L, 29C.

LOCOMOTIVES

4 ton to 22 ton, single and tandem units.
Jeffrey, Goodman, General Electric & Westinghouse. 45 in stock, 250 and 500 volt DC.

LOADING MACHINES

3 Joy 12BU, type 9E. 14BU. 8BU. 7BU & 11BU.
Myers Whaley & Goodman track loaders. All DC, 250 volt.

MISCELLANEOUS

Joy Cat Trucks, model T-1.
Joy Shuttle Cars, 6SC and 5SC.
Brown Fayron & Joy Car Spotters.
10 Joy Elevating Conveyors, PL 11—14.
Joy Belt Feeders, PL-12.
Four 8000 Gal. Tank Car Tanks.
3000 Five Gallon G.I. Gas & Water Cans.
Mine Cars, 42", 44" & 48" Ga., drop bottom and end dump.
Transformers, 2 to 3000 KVA, most voltages.

CONVEYORS

4 Jeffrey 52B, 30" Belt Conveyors.
1 Joy MT2, 30" Belt Conveyor.
Jeffrey 61 AM, 12" Room Conveyors.
Jeffrey 61 HG Face Conveyors.
Goodman 30" x 400' Belt Conveyors.
Goodman 30" Head & Tail Sections.
Joy UN-17 Shaker Conveyors.
Goodman G-15 Duckbill units.
Barber-Greene 24" x 32' portable Belt Conveyors.

TIPPLE EQUIPMENT

Complete all steel, four track tipple. New in 1948 with washer, crushers, etc.
Vibrators, single and double deck.
Feeders, Picking Tables, Loading Booms, Hoists, complete tipples.

MISCELLANEOUS

New hydraulic tow trucks.
2 MSA Rock Dusters, like new.
Sirens 3 H.P.
Jeffrey 35BB, 29L, 35L, 29C spare armatures and field coils.
Pipe Threading Machines.
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Machine Tools. Coal Drills.
New Alemite portable Greasing Unit.
Quickway Truck Shovel.
Copper Trolley & Feeder Wire, 1/0 to 1000 MCM. Other sizes also.
Pumps, all types.
Relaying Rails 20 to 90 lbs.
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FOR SALE

15 KW HILL GENERATOR SET

Model 4R diesel — radiator cooled — 1450 RPM32.1 HP—120/240 volts DC—3 wire—compound wound—drip-proof.

30 KW SHEPPARD GENERATOR SET

30 KW — 115 volts DC—compound wound—240 amps. — radiator cooled. Sheppard model 12 4x5 diesel — rebuilt 1953—excellent condition.

60 KW CUMMINS GENERATOR SET

2 New—1 Used—Model HG17—G.E. generator—120 volts—500 amps.—1500 R.P.M.

75 KW WAUKESHA GENERATOR SET

75 KW—230 volts DC—totally enclosed, self-contained. Waukesha 6 cyl., 160 HP, 1200 RPM diesel driving 75 KW 1200 RPM G.M. marine type generator. Self-contained switchboard and radiator.

100 KW AC GENERATOR SET

Lorimer 5 cylinder 700 RPM diesel—electric starting—440/60/3 with switchgear.

100 KW GM GENERATOR SET

Model 3-268A diesel—440/60/3 AC

300 KW GM GENERATOR SET

GM 8 cyl. 6½x7 diesel model 8-268A—120/240 volts DC — 1250 amps. — 1200 rpm — with switchgear.

SUPERIOR HEAVY DUTY DIESEL

510 HP at 360 RPM—5 cylinder—14½x18—type ZDSB—non-reversing—vertical—4 cycle—cold starting—mechanical injection. Engine totally enclosed. Complete with 48" 7 groove V-belt sheave and new spare parts. For heavy duty pumping, dredge service, power generation, textile and saw mills, mining, etc. Excellent condition. For immediate delivery.

(1) 300 GPM ELECTRIC PUMP

146' head bronze centrifugal pump—driven by 20 HP 230 volt motor.

(1) 1000 GPM SUBMERSIBLE PUMP

70' head — 25 HP 440/60/3 motor — self-contained 6" pump.

AXIAL FLOW FANS — AC & DC

THE BOSTON METALS CO.

313 E. Baltimore Street
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Curtis 7-5050

MOTOR GENERATOR SETS

750 KW Al. Ch. 275 v. 720R-Syn. 440 v./2300
600 KW G.E. 275 v. 900R MPC-ATI 2300/4000 v.
400 KW West., 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West. 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West., 275 v. 1200 R SK-Syn. 2300/4000 v.
150 KW G.E. 275 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 550 v. 900 vR-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
100 KW G.E. 275 v. 1200 R. RC-ATI 2300 v.
75 KW G.E. 275 v. 1200R. MPC-Sq. Cg. 2300/440v.
50 KW G.E. 275 v. 1200R. MPC-Sq. Cg. 2300/440 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.

ROTARY CONVERTERS

2—500 KW G.E. 275 v. HCC6-1200R. 13,200 v.
300 KW G.E. 275 v. HCC6-1200R. 2300/4000 v.
300 KW G.E. 275 v. HC12-600 R. 2200/4000
300 KW West. 275 v. 1200R. 2300/4000 v.
200 KW G.E. 275 v. HCC6-1200. 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
Will rewind transformers to your specifications.

AC & DC REBUILT MOTORS—Any size

Transformers — Hoists — Compressors — Pumps — Conveyors — Loading Machines — Cutting Machines — Locomotives — Shuttle Cars, etc.

MOORHEAD ELECT. MACH'Y CO.

P.O. Box 7991C — Pittsburgh 16, Pa.

1—29U Jeffrey Cutting Machine converted to Rubber Serial #21569.
3—11BU-7E Joy Loading Machines Serial Numbers 1922, 5059 and 5035.
1—10 Ton G. E. Loco, Type HM8306 Serial #10419.
1—8 Ton Jeffrey Loco, Type 839A Serial #8929, Cable reel.
1—G.E. 300 KW Motor-Generator Set, Automatic G.E. #709, Model #11G865, Generator #1862521.
1—8 Ton Jeffrey Loco, Type CDM, MH106 Ser. #5712 w/ cable reel. 42" T/Cage.
1—8 Ton G.E. Loco, Type HM 819, Serial #6687, 42" T/gage. Cable reel.
3—30 KVA Gregory Electric Co., Type HE Transformers, Serial #'s 46101309, 46101310, 46101311.
2—15 KVA Western Electric Co. Transformers, Type H, Serial #2735046-47.
1—15 KVA General Electric Co., Transformer, Type H, Serial #3166078.

FARLAND FUEL CO.

Rt. #1, Shinnston, W. Va. Phone 301 or 302

FOR SALE

New 500 Gal. Skid Mounted STORAGE TANKS

Shell of ¼" Steel, 2" Outlet and 12" Manhole in Top.

LEFTON INDUSTRIAL CORP.
212 Victor Street, St. Louis (4) Mo.

FOR SALE

In Excellent Condition

A Northwest Model 80-D Shovel, Serial 8610, Murphy Diesel Engine. Has been maintained by superior mechanics. Can be supplied with a 2½ cu. yd. rock bucket or a 3⅛ cu. yd. coal bucket. Located in Ohio. A real bargain at $29,500.00 loaded on cars. For inspection, contact Sunnyhill Coal Company, 3090 West Liberty Avenue, Pittsburgh 16, Pa.

MINING EQUIPMENT

For Sale — All or Partial

80 tons Rails, 18 to 35 lb.
4-0 Fig. 8 Trolley.
Machine wire 4-0 and larger.
2 Jeffrey Cutters, 1—50 H.P. and 1—35 H.P.
2—Dooley Drills.
1—Jeffrey 4 ft. fan and motor.
2—150 H.P. Boilers and extra flues.
5 ton Locomotive.
2—Water Tanks, 1—4000 and 1—5000 gal.
1—Sinking Hoist.
1—Steam Generator.
1—Steam Hoist.
Smoke Stacks.
Shakers.

Also other equipment. Please inquire:

Edgar County Coal Co., Inc.
Paris, Illinois

FOR SAFETY
NEW CROUSE HINDS EXPLOSION PROOF TELEPHONES
Immediate Delivery
At Fraction of Current Cost
$375.00 MODEL ETG-24 @ $100.00
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Loud Ringing Bells Installed
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DIESEL ENGINES • GENERATOR SETS
10 TO 2000 KW • AC&DC • GUARANTEED
A.G. **SCHOONMAKER CO., INC.**
Plants: SAUSALITO(S.F.)CAL., JERSEY CITY, N.J.

We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.

LOCOMOTIVES

1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton G. E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 42" Double Roll Crusher
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

1—5 HP Brownie Room Hoist
2—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist
1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
1—Ingersoll-Rand Model EU Air Tugger Hoist
2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
1—10 HP Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

1—8BU Joy loader
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box Single Drum Hoist, 800 FPM with 375 HP GE Slipring Motor, 575 RPM, complete with controller, grids and magnetic contact panel.
1—600 HP Box Single Drum Hoist, 25,000# Rope Pull, 900 FPM, Hydraulic Post Breaks with 600 HP Westinghouse Slipring Motor, 435 RPM, controls and magnetic contact panel.

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget blowers

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

2—50 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Bucket Elevator, 36'6" centers, 18" x 8" buckets.
1—Bucket Elevator, 45' centers, 6"x4" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8", 36" wide
1—Jeffrey Scraper Conveyor, 88'6", 36" flights
1—Jeffrey Scraper Conveyor, 72', 30" flights
1—Jeffrey Scraper Conveyor, 67', 30" flights
1—Jeffrey Scraper Conveyor, 69'6", 28" flights
1—Link Belt Scraper Conveyor, 50', 12" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

PIT CARS

125—60 cu. ft. Card steel coal mine cars, 36" ga.
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150 KW & 200 KW, 1200 rpm, 275 volts DC, compound wound, interpole, 6 ring, 60 cycle, synchronous converters with transformers and switchboards.
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1—500 KW, Motor Generator Set — Westinghouse, Serial #4979928, 2300 volt synchronous drive, 3 phase, 60 cycle, 714 HP, 900 RPM; Generator 240/275 volts DC. Complete with reduced voltage magnetic starter.
2—500 KW, Rotary Converters; 1—General Electric, Type HCC, Serial #842327, 1200 RPM, 6 ring, 275 volts DC, 1800 amps, complete with transformer and switch gear, 2300/4160 volts, 3 phase, 60 cycle. 1—Allis-Chalmers, 1200 RPM, 6 ring, Serial #113258, 275 volts DC, 1800 amps, complete with transformer and switch gear, 2300/4160 volts, 3 phase, 60 cycle.
1—200 KW, Rotary converter, Westinghouse, 1200 RPM, Serial #1555041, 6 ring, 60 cycle, 275 volts DC, 800 amps. Complete with transformer and switch gear, 2300/4160 v., 3 ph., 60 cy.
NEW direct current motors in stock—¼ HP. through 75 HP.

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2—Alike 200 KW, 1200 RPM, 600 volt, Westinghouse rotary converters, Serial #1,281,831-2. Each unit has (3) 75 KVA transformers, 6600 volts primary. One of the units is rated 190/326 volts secondary; the other, 104/314 volts secondary. Serials are 334,000.

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PRICE SLASHED ON WALKING DRAGLINE

9 cu. yd. 625E Page Electric Walking Dragline with 150 ft. boom. Machine has been maintained by superior mechanics and is in excellent condition. Located Ohio. A real bargain at $129,500.00 loaded on cars. For inspection contact Sunnyhill Coal Company, 3090 West Liberty Avenue, Pittsburgh 16, Pa.

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MORE INFORMATION on any product advertised in COAL AGE may be easily secured by using the postage-free card facing p. 125.

SEARCHLIGHT SECTION
(Classified Advertising)
H. E. Hilty, Mgr.

ADVERTISERS INDEX

* Indicates that detailed information may be found in the 1952-1953 MINING CATALOGS.

This index is published as a convenience to the reader. Every care is taken to make it accurate, but C. A. assumes no responsibility for errors or omissions.

What can you do ... with half a motor?

When you write an order for coils for a motor with a mechanical defect *you write an order for trouble* . . . unless the mechanical defect is repaired at the same time.

It's poor economy to condemn a new or usable winding to a short life by failing to correct questionable bearings, shafts, mechanical fits and alignments.

All three big National shops are equipped to make your motors right *mechanically* as well as *electrically*. We can do any electrical or mechanical work on your locomotives, shuttle cars or other electrically-operated equipment.

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NATIONAL ELECTRIC COIL COMPANY

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ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

4-minute cycle cuts stripping time

One of Allyn Mann's DW21-No. 21 rigs spreads a big load of overburden. Positive ejection gets any type of material out of the bowl fast, in a Caterpillar Scraper.

Allyn Mann Construction Co., working on a 500,000-yard coal-stripping contract near Camrose, Alberta, Canada, speeds up the removal of overburden with Cat* DW21 Tractors and No. 21 Scrapers.

The big yellow rigs load up to 20 cu. yd. per trip and make 15 to 20 trips an hour on a haul of 900 to 1,200 feet. While the upper layer of material on this operation is easy to handle, there are 12 feet of blue clay on top of the coal, making tough digging.

W. Mortenson, Superintendent, says: "The equipment we formerly used cost us about $40,000 in two years. Our DW21s are going to save us a lot of money in repairs and earn much more than we thought possible."

The Caterpillar DW21-No. 21 combination is designed to build profits, eliminate accidents and down time. The full floating axle, hydraulic steering and positive cable controls are definite advantages in steady work production. And the scraper is designed for fast loading and clean spreading—the most important factors in cycle time.

Your Caterpillar Dealer has machines for prompt delivery and the service and parts to keep them working profitably. Ask him for an on-the-job demonstration that will *prove* what they can do for you.

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TRU-LAY Preformed WIRE ROPE

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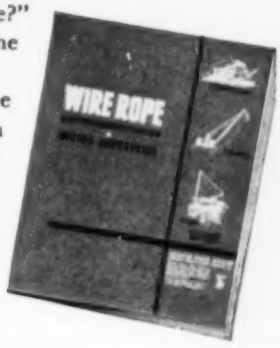
• Among other reasons, it has more of each wire exposed to wear and will last longer. We might also ask "Why should flattened strand be used for the scraper's cable?" An answer would be—it lasts longer because its relatively flat surface spreads the wear better.

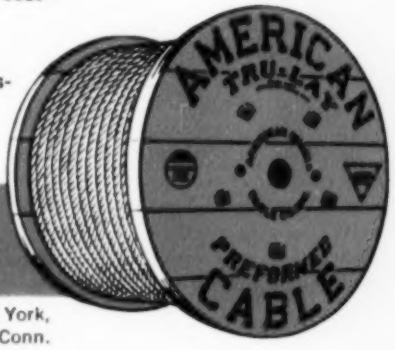
Four different wire ropes are used on the two machines illustrated, three on the shovel and one on the scraper. Each rope is a different construction, and each construction recommended was decided upon by American Cable's engineers after years of careful recording of results of many, many field studies.



This Book Gives Recommendations

Recommendations based on these records are listed clearly in the 12-page "Wire Rope Recommendations for Mining Industries" which shows the best TRU-LAY Preformed construction for the machines you operate. It's full of pictures which makes it easy to find the recommendation you need. Here is a booklet which will help you get longer service—which means lower cost—from every wire rope you use.

See your nearby American Cable distributor who stocks popular TRU-LAY Preformed "Green Strand" Wire Ropes, or write our Wilkes-Barre, Pa., office for your free copy of **DH-128-A** "Wire Rope Recommendations for Mining Industries."



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LINK-BELT Multi-Louvre Dryer requires as little as one-half the horsepower used by other dryers

IN reducing the moisture of any size coal between minus 28-mesh and 1½-inch pieces, the Multi-Louvre Dryer is fast, safe, **low-cost.** Its unique design minimizes air pressure drop—***cuts power requirements as much as 50%.*** And this low air velocity also reduces degradation and dusting . . . makes effective dust collection easy.

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To find out how you can dry as high as 150 tons of coal per hour with a Multi-Louvre Dryer, call your nearby Link-Belt office. Chances are Link-Belt's broad coal preparation experience can give you a more marketable product.

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